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MONTANA

Fish and Game Commission

QUARTERLY REPORT

STATE DOCUMENTS



Wildlife Restoration Division

APRIL - JUNE 1953

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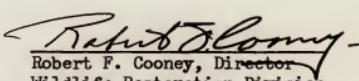
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Dear Sir:

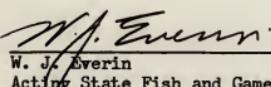
We are herewith submitting a Quarterly Progress Report in connection with the projects carried out through the use of Federal Aid in Wildlife Restoration funds.

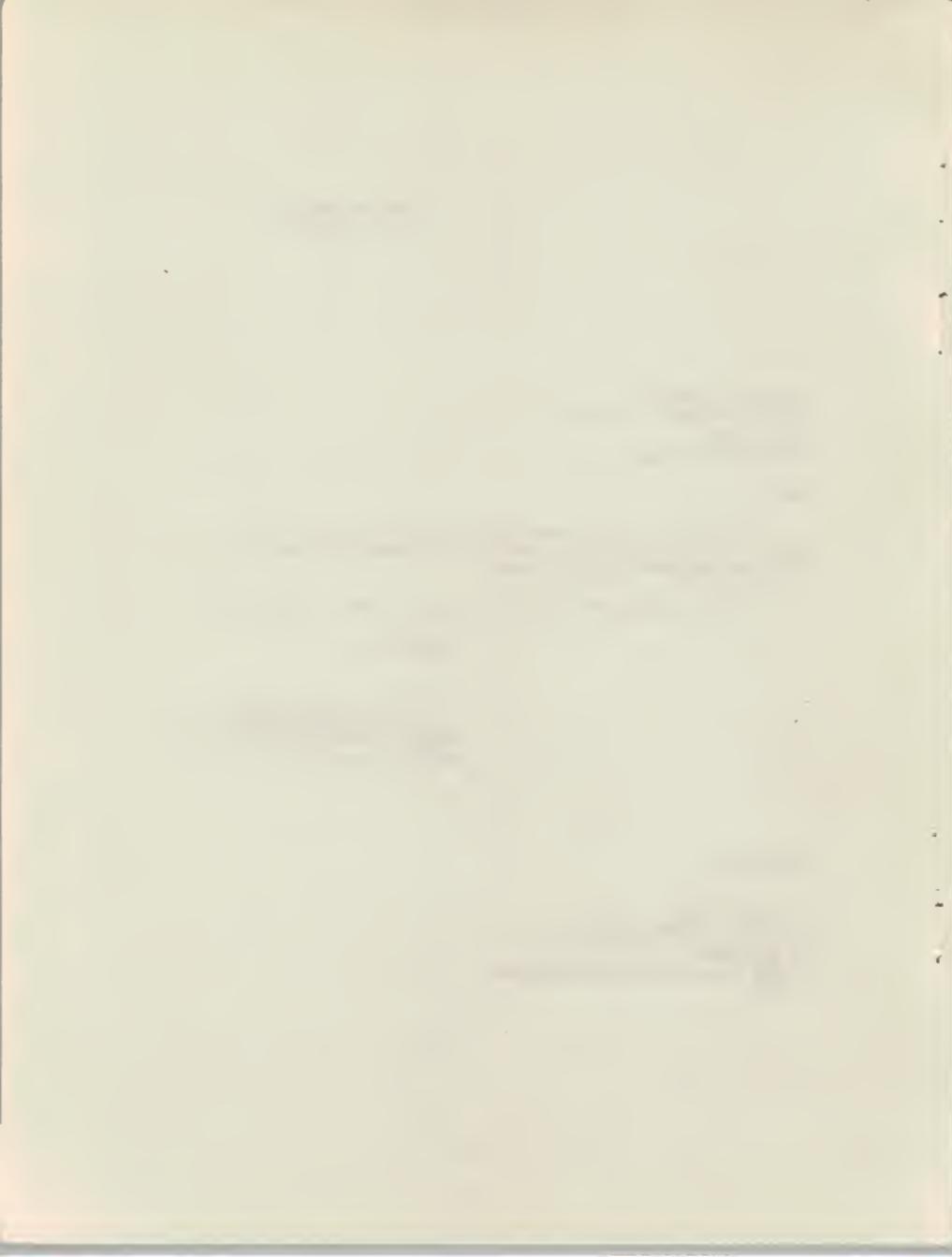
The coverage is for the period April, May and June, 1953.

Submitted by:


Robert F. Cooney, Director
Wildlife Restoration Division

Approved by:


W. J. Everitt
Acting State Fish and Game Warden



QUARTERLY PROGRESS REPORT
For The
WILDLIFE RESTORATION DIVISION

STATE OF MONTANA

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Volume IV Number 2

April, May and June
1953



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STATE	Montana
PROJECT NO.	W-1-R-12 (Eastern)
DATE	July 15, 1953
VOL.	IV
NO.	2

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Wildlife Surveys and Management (Eastern)

2. Personnel: Don L. Brown, Biologist, Leader
 George B. Chaffee, Junior Biologist
 Joe L. Egan, Junior Biologist
 Glen F. Cole, Student Assistant

3. Report of Progress:

Work Plan I: Antelope Census, Herd Production, Migration and Mortality Studies

Job I-A: Antelope Census
 Annual Job Completion Report pending.
 Progress Report, Eastern Montana Antelope Survey, attached.

Job I-B: Antelope Herd Production Studies
 Annual Job Completion Report pending.

Job I-C: Study of Antelope Migration and Population Shifts
 Annual Job Completion Report pending.

Job I-D: Study of Antelope Losses by Hunting and Natural Causes
 Annual Job Completion Report pending.

Work Plan II: Relationship of Antelope to Agriculture and Range Land Use

Job II-A: Relationship of Antelope to Winter Wheat Production
 Proceeding.

Collection of stomach contents proceeding. Enclosures will be established in 1953 for securing comparative yield data from the 1954 harvest. Observations of antelope on wheat fields will be recorded with respect to antelope activities and time intervals.

During the last period considerations of antelope use on winter wheat have been subordinated to the relationship of antelope to seed and feed alfalfa and the relationship of antelope to range land.

On March 28, 1953, two antelope were seen on a wheat strip. Examination of the site showed wheat sprouts two to three inches high were being taken. Data were obtained on the extent of use on wheat at the site but are insufficient without additional examinations. Concentration on the antelope-winter wheat aspects is intended upon completion of the alfalfa feed and seed relationship.

Job II-B: Relationship of Antelope to Seed and Feed Alfalfa
Progress Report attached.

Job II-C: Relationship of Antelope to Range Land
Progress Report attached.

Job II-D: Antelope Damage to Agriculture Crops (Powder River Unit)

Although for the most part, this project has been inactive during the report period, information on hand indicates there is somewhat of a decrease this year in the economic conflict between antelope and agriculture. This might be attributed to the occurrence of substantial rains during late May and the first part of June this year. However, the unit seems to be rapidly drying up and complaints may increase during the coming months. It is hoped the large harvest scheduled for this fall will remedy the situation to a great extent during next year. Investigations will be resumed on the project during August and September of this year.

Work Plan III: Deer Food Habits Study on Badland Type Range

Job III-A: Important Food Plants Used by Deer in Badlands
Inactive during report period.

Job III-B: Evaluation of Range Conditions and Degree of Use
In Key Species

Inactive pending Fish and Wildlife Service and Bureau of Land Management reports.

Job III-C: Population Studies of Deer (Missouri River Breaks)
Inactive during report period.

Work Plan IV: Mule Deer Food Habits on Grassland Type Range

Job IV-A: Mule Deer Food Habits on Grassland Type Range
Inactive during report period.

Job IV-B: Population Studies (Little Belt Mountains)
Progress Report attached.

Work Plan V: Census and Survey of Deer Herds in Eastern Montana

Job V-A: Population Studies of Deer (Powder River Unit)
Inactive during report period.

Job V-A-1: Mule Deer Damage to Alfalfa (Powder River Unit)

Although there has been a considerable amount of moisture in the area this spring, the alfalfa crop does not seem to be doing very well. As a consequence rancher complaints appear to have decreased from past years. An ample supply of browse plants resulting from the spring rains presumably aided in keeping deer away from the alfalfa. Another factor which also helped in this problem, is the preponderance of reservoirs which are full. Additional investigations will be carried out on this project during August and September.

Job V-A-2: Collection of Analysis of Deer Stomachs in Ashland District

This project has been inactive during the past six months, but it is hoped that it can be resumed at a later date. It is believed that projects of this nature should be carried out on a year around basis, that is, the collections should be made every month for several years.

The feasibility of carrying out this project will be investigated.

Job V-B: Deer Population Studies of Carter Unit
Inactive during report period.

Work Plan VI: Study of Introduced Mountain Sheep Herds in Badlands

Progress Report attached.

Work Plan VII: Census and Survey of Elk Herds in Eastern Montana

Job VII-A: Census and Survey of Established Elk Herds
Annual Job Completion Report pending.

Job VII-B: Investigation of Recently Introduced Elk Herds

Progress Report pending.

Work Plan VIII: Investigation of Mountain Sheep Transplanting Sites

Aerial checks of several proposed areas narrowed down the choice to one area near the mouth of Bullwhacker Creek for ground investigation.

Work Plan IX: Questionnaire Analysis of Special Season Card Returns

Annual completion report pending compiling of data.

Submitted by:

Name Don L. Brown

Approved by:

Montana State Department of Fish and Game

Title Biologist

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

JOB PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. 1-R (Eastern) Work Plan No. I Job No. I-A

Title of Job Eastern Montana Antelope Survey

Date May and June 1953

PERSONNEL: W. Linville, Deputy Warden
W. Maloit, Deputy Warden
R. Shields, Deputy Warden
J. Niclaiy, Deputy Warden
Don L. Brown, Biologist
G. Chaffee, Junior Biologist
J. Egan, Junior Biologist

OBJECTIVES:

To obtain antelope densities and yearly population fluctuations in the big game management units of eastern Montana.

TECHNIQUES USED:

The units were covered by the aerial strip method, using partial and complete counts. The complete count was used in areas reported to have excessive numbers of antelope and in certain representative areas of the Glendive Management Unit. In complete counts the north-south flight strips are one mile apart. Indications are, that practically all of the antelope are observed in areas covered by this manner.

In employing the partial count, the north-south flight strips are six miles apart and a population for areas covered by this method must be computed. Dividing the number of antelope observed by the strip miles (antelope per square mile) and multiplying this figure by total square miles, gives a computed antelope population.

For both types of coverage, the observer tabulates all antelope within 1/2 mile on each side of the flight strip.

Since the survey was started prior to the appearance of many fawns, they were not counted during the survey.

To facilitate coverage during the survey, prominent topographic features such as roads, creeks, etc., were used to delineate areas of a workable size.

The survey covered the Powder River, Carter, Custer and Missouri Breaks Management Units and a portion of the Glendive Management Unit. Areas of total and partial coverage are shown in Figure I. (Complete coverage in red, partial not colored)

With a few exceptions, all flights were made during the first two to four hours after sunrise and the two to four hours before sunset.

FINDINGS:

For the area covered as shown in Figure I, a total of 31,775 antelope was ascertained to be present. (The foregoing figure does not include fawns.)

Buck-doe ratios ran from 1:0.4 to 1:3.5, and antelope densities ran from 0.5 antelope per square mile to 2.7 per square mile. These are shown in Table I.

Areas A, B, C and D, representing sample areas in the Glendive Unit are not included in Table I, they are listed below as to antelope observed, and square miles surveyed.

<u>Area</u>	<u>Antelope Observed</u>	<u>Total Area (Sq. Miles)</u>
A	22	124
B	17	154
C	6	50
D	139	171

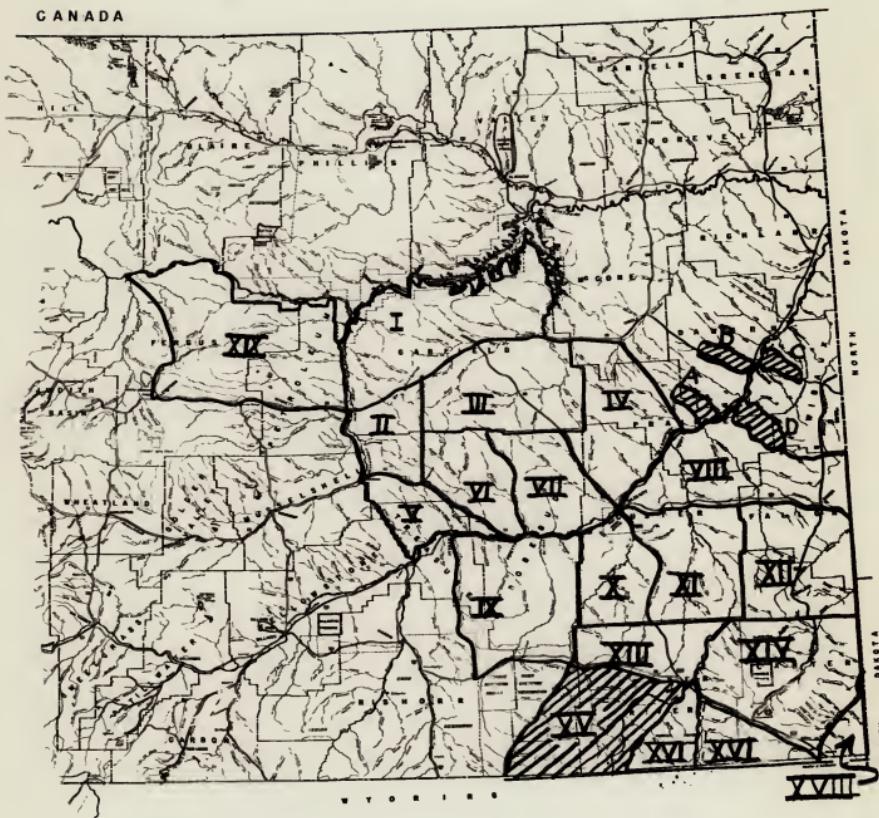
In setting up the 1953 hunting seasons for the areas surveyed, a figure of 50% was added to the populations to compensate for the current fawn crop. This gives a total computed population of approximately 48,000 antelope.

CONCLUSIONS AND RECOMMENDATIONS:

The computed population of 48,000 is not felt to be a saturated population for the area surveyed. There exists, however, a feeling by many ranchers that this number of antelope constitutes a serious menace to the agricultural activities in the area.

For this reason and until data are accumulated which will ascertain the optimum number of antelope that can be present on the various portions of the area surveyed, it is recommended

Figure 1. Eastern Montana Antelope Survey



|||| Complete Coverage (1 Mile Strips)



TABLE I

Area	Number Antelope Observed	Strip Miles	Antelope Per Sq. Mile	Total Area (Sq.Mi.)	Buck Doe Ratio	Total Antelope Computed	% Antelope Classified
I	211	282	0.75	2554	1:1.21	1915	44
II	435	160	2.70	698	1:1.65	1871	62
III	242	245	0.99	2163	1:1.1	2141	56
IV	288	323	0.88	2113	1:0.83	1859	62
V	152	111	1.37	703	1:0.94	963	59
VI	305	116	2.6	968	1:0.97	2517	48
VII	112	191	0.58	942	1:2.0	546	58
VIII	173	153	1.13	1045	1:1.14	1181	80
IX*	77	110	0.70	2845	1:0.4	1992	55
X	122	58	2.10	952	1:0.95	1999	30
XI	164	167	0.98	1531	1:0.90	1500	44
XII	212	228	0.92	1513	1:3.61	1392	69
XIII	233	237	0.98	1102	1:0.85	1083	39
XIV	394	271	1.45	2041	1:0.78	2960	49
XV**	1328	1491	0.89	1491	1:1.93	1328	65
XVI	145	90	1.61	504	1:0.66	811	47
XVII	173	125	1.38	1454	1:0.81	2007	43
XVIII	176	71	2.48	300	1:0.46	744	38
XIX	347	365	.95	3123	1:1.50	2966	55

5289

31,775

* Sample area of Northern half.

** Total coverage.

the above figure be reduced by hunting by 35% or a reduction of 16,675 head of antelope.

Providing the reduction is accomplished this fall, it is further recommended that in subsequent years the annual increase be harvested.

Annual or biennial surveys will produce the bulk of the necessary information needed to properly manage antelope in Eastern Montana.

Prepared by:

Name Joe L. Egan

Date August 3, 1953

Approved by:

Name Don L. Brown

JOB PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-1-R-12 Work Plan II Job No. II-B

Title of Job: Relationship of Antelope to Seed and Feed Alfalfa

Date: March 31, 1953 to July 29, 1953

PERSONNEL:

Glen F. Cole, Student Assistant

OBJECTIVES:

To obtain quantitative data on the relationship of antelope to seed and feed alfalfa.

TECHNIQUES USED:

One yearling and one adult male antelope are collected each month from an 80-mile square study area. A quart sample of the rumen contents are preserved for volumetric and air-dried weight analysis. The remainder of the rumen contents are air-dried for weight determinations. Collection sites are recorded for later plotting of airline distances to alfalfa. Plants present at the collection site are listed for later comparison with the stomach analysis. In addition to the material collected for food habit determinations, the testis, lower jaws and heads of antelope are saved.

Three alfalfa fields are under observation on the study area. Periodic checks of these fields are made and records are kept relative to the time of day, whether antelope are present or absent, the number and composition of antelope groups present and their activities.

Three experimental one-acre plots were established on two alfalfa fields and seven randomly located exclosures were constructed for securing comparative yield data by clipping.

Twenty-six antelope fawns were tagged with metal stock tags in each ear and plastic ear markers. Fawns tagged at distances greater than one mile from the alfalfa fields under observation received left ear plastic markers. Fawns within a one mile radius received right ear plastic markers. Additional information was obtained on fawn dentition, weights and left hind foot measurements. Records were kept of tagging sites with respect to vegetational types and points of

reference for plotting airline distances traveled. Attempts are made to classify fawns seen on the area as either untagged, tagged and right or left ear tagged. Special effort is made to identify tagged fawns and relocations are recorded for plotting airline distances.

Detailed notes are kept on male antelope having distinctive and recognizable horn peculiarities. Relocations of these males are recorded for airline distances between relocations.

Routes are established on the study area and covered by car. Areas are recorded as having no antelope or antelope present with respect to the time of observation. Antelope seen are recorded as to their location, the vegetational type, numbers, sex and age and their activities. When possible, time intervals of antelope activities are taken.

FINDINGS:

The eventual findings of the study are subject to the indications of quantitative data. Since field work is still in progress, the writer has not had sufficient time to adequately work over the data.

The indications of the relationship of antelope to alfalfa from collected stomach samples is pending further analyses and the tabulation of this data. Testis, lower jaw and head collections have no relation to alfalfa and are collected incidental to the stomach sample and paunch contents. With additional material, information on the male reproductive cycle and antelope tooth succession and wear should result.

Field check data has not been tabulated. However, use prior to the first cutting of alfalfa was so light as to suggest that most antelope on the study area had no preference for alfalfa over native range forage.

Antelope were only infrequently seen on one of the experimental one-acre plots. This plot was later severely damaged by weevils. The antelope ceased to use it and the plot was not clipped. Two other one-acre plots received no observed use by field checks. One of these plots was selected for clipping in order to obtain some idea of the variability to be expected without antelope use. Ten 1/1000 acre clip plots were randomly located within the acre area. Two 1/1000 acre clip plots were clipped within each of two exclosures for a total of 14 clip plots. Indications are that there is considerable variation in the weight production of one acre of alfalfa. The average of the 14 clip plots is 3.0 pounds (air-dried) with a range of 2.2 to 4.0 pounds. Considering antelope habits of taking terminal portions of the alfalfa plant, actual weight losses of forage from antelope use might be obscured unless the use was extremely

heavy. Approximate weights of forage taken by antelope may have to be inferred by considerations of how much air-dried forage an antelope is capable of consuming (obtained from rumen weights), and the percentages of air-dried alfalfa in rumens (stomach analysis). Since there is some indication that the drying up of native forage influences antelope use on alfalfa, relative air-dried weights of alfalfa might be correlated with phenology. Another approach which might serve as an index to the amount of alfalfa consumed would be the time interval of observed use on alfalfa. The air-dried percentages of alfalfa, where alfalfa use has been timed prior to collecting the animal, could serve as a basis for calculating forage consumed when the amount of time antelope have fed on alfalfa is known.

In order to obtain information on antelope use, nine 1/1000 acre clip plots were equally spaced 136 feet apart from the east end of a field where from one to seven antelope were known to feed. As with the experimental acre plot, dried weight production was quite variable between clip plots. More pronounced however, was the variation in the number of stems (293 to 1423 range) on the nine clip plots. Three plots located on the east end adjacent to range land had 26.3, 20.2 and 19.9% of the stems clipped by antelope. Three plots centrally located and 117 feet west of the plots on the east edge had 18.5, 11.0 and 3.9% of the stems clipped. The next and last tier of the three plots, 234 feet within the field from the east edge, had 7.9, 22.2 and 7.2% of the stems clipped.

The data are insufficient for any conclusions. However, there is a suggestion of a use-gradient from the edge of the field inward. The exception to the gradient is the 22.2% use on the third tier and 3.9% on the second tier of clip plots. It is of interest to note that the clip plot having 22.2% use on the third tier had the minimum number of stems (293) and occurred on a dead furrow having relatively few, but vigorous plants. The plot having 3.9% of the stems used in the second tier had the maximum number of stems (1423) and these were small and stunted. The counting of alfalfa stems is quite tedious but does provide quantitative data which should prove applicable for evaluating the effects of antelope on alfalfa seed production.

Tagged fawns have not been observed on alfalfa. To date, a total of 72 relocations, of which three have been recaptures, have been accomplished. Of the 26 fawns tagged, ten have not been relocated after the initial tagging. Airline distances have not been plotted, but left ear-tagged fawns (plastic on left ear) have moved into right ear tag areas and vice versa. Numerous determinations of fawns being either right or left ear tagged have been made without being above to recognize the individual fawns.

Notes which have been kept on male antelope with distinctive horns have given information on the movements of individuals and sociology of antelope groups.

Routes through the study area have enabled the writer to keep a check on the antelope. Movements indicated by negative information for one area and positive for another are occasionally substantiated by tagged fawns and the recognition of adult males. The tabulation of recorded observations of antelope activities with respect to time should provide information on this aspect of antelope habits.

CONCLUSIONS AND RECOMMENDATIONS:

No conclusions or recommendations are warranted at this writing.

Submitted by G. F. Cole Approved by Don L. Brown

Date July 30, 1953

JOB PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-1-R-12 (Eastern) Work Plan II Job No. II-C

Title of Job: Relationship of Antelope to Range Land

Date: March 31, 1953 to July 29, 1953

PERSONNEL:

Glen F. Cole, Student Assistant

OBJECTIVES:

To obtain quantitative data on the relationship of antelope to range land.

TECHNIQUES USED:

1. Stomach analyses
2. Examinations of 1/1000 acre plots at observed feeding sites
3. Observation of activities and movements

FINDINGS:

Field work is still in progress and findings will be subject to the indications of quantitative data which have not yet been worked over.

The collection of stomach contents is proceeding in conjunction with the alfalfa study. Indications of the relation of antelope to range land from stomach samples is pending further analyses and tabulation of data.

Antelope-minutes as an indication of food habits have not proved too applicable to the antelope on the study area. Vegetation is predominately Big Sage Artemisia tridentata which hinders observations of antelope when they are feeding on low vegetation. Also antelope on the area are extremely wary and attempts to approach within a range where plants could be recognized have been largely unsuccessful.

Indications of food habits on range land by the examination of 1/1000 acre plots placed at observed feeding sites were obtained while antelope were in large groups. From April 4, 1953 to June 6, 1953, forty-three plots were laid at feeding sites. With the herds breaking up, use on plants became so scattered that often only one or two plants could be found used within a 1/1000 acre area. At this time, the examination of 1/1000 acre plots was abandoned in favor of listing all plants along the antelope tracks or direction of travel and tabulating the number of times each plant was found used. Data are still being obtained by this listing method.

Activities and movements of antelope on range land are indicated by the same methods and in conjunction with the activities and movements with respect to alfalfa. Tagged fawns and identifiable male adults relocations, area records from established routes and activity data have been obtained for antelope on range land. This information is still in note form and will be tabulated upon completion of the study.

CONCLUSIONS AND RECOMMENDATIONS:

No conclusions or recommendations are warranted at this writing.

Submitted by Glen F. Cole Approved by Don L. Brown

Date July 30, 1953

JOB PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-1-R-12 Work Plan IV Job No. IV-B

Title of Job: Investigations of Deer Mortality in the Blacktail Hills
Winter Range

Date May 9, 1953

PERSONNEL:

Don L. Brown, Biologist
Robert Eng, Junior Biologist
Glen Cole, Student Assistant
George Chaffee, Junior Biologist

OBJECTIVES:

1. To investigate reports of deer mortality in the Blacktail Hills winter range.
2. To evaluate the extent of malnutrition and the relationship to winter range conditions.

TECHNIQUES:

A system of ground survey employing four transects across the study area was used. Each transect included a two mile strip at intervals of about one hundred yards across an area, representing six square miles of the Blacktail Hills winter range. An additional survey was made by traversing around the perimeter of the Blacktail range by use of the Dry Wolf and Running Wolf road. A thorough coverage was possible on the transect area and all deer visible from the roadside were examined on the vehicle survey.

FINDINGS:

An investigation commenced on May 9, 1953, to determine the extent and nature of deer mortality previously reported in the Blacktail Hills of Judith Basin County. This region, bordered by Dry Wolf Creek to the west and Running Wolf Creek to the east, serves as a winter range for mule deer that migrate from summer ranges on Dry Wolf Creek, Running Wolf Creek and a portion of Sage Creek. A heavy density of mule deer are evident on this range.

The Blacktail Hills winter range is predominately in the Judith Basin Grassland vegetative zone. Characterized by a rolling foothill type of topography, the area supports moderate densities of Ponderosa pine and Juniper, with an understory of short grasses, forbs and shrubs.

No attempt was endeavored to conduct a reconnaissance of the range, rather an ocular estimate of forage abundance with emphasis on the availability of the primary forage species and the degree of utilization was made. (Table 2)

A total of twenty-one dead deer were enumerated from the transect area and the vehicle survey. Thirteen fawns and eight adults comprised the total mortalities observed. Age class was determined by examination of available dentition of each specimen. The deer were classified as adults or fawns.

Application of the Cheatum's Bone Marrow Index Method for determining extent of malnutrition provided a valuable criteria for classification of the various stages of bone marrow depletion. The femur bone was examined on each deer carcass for estimated fat content in the bone core. Corresponding color phases were listed as shown in Table 1, without the numerous gradations of colors or per cent content of fat storage in each marrow core.

Marrow Appearance

Age Class	White	Spotted White-Red	Red Solid	Red Gel	Yellow	Dried	Total
Fawns	2	1	2*	6	2	0	13
Adults	0	0	0	2	5	1	8

* Tibia and Fibula bone marrow

Table 1

Analysis of the total fawn mortalities reveals that six forms exhibited a red gelatinous stage. This represents 46% of the total fawn mortality that encountered serious depletion of the femur fat. Emaciated body conditions on some of the more recent mortalities accompanied the red gelatinous stage. Fawns found with a red solid marrow stage numbered two or represented 15% of the total fawn mortality.

Fawns displaying no fat withdrawal or those in the white condition numbered two or 15% of the total fawn deaths. The

remaining fawn carcasses showed varying degrees of white and yellow marrow fat stage.

Examination of the adult deer carcasses reveals less reddening with a corresponding high percentage of yellow marrow fat. Of the adults, 62% illustrated this yellow stage, whereas 15% of the adults with red gelatinous stages indicated signs of severe depletion of the femur fat reserve. One adult fawn indicated an early death by the presence of a dried marrow content.

An inventory of range conditions with regard to the availability of key forage species and the degree of utilization was made on the Blacktail Hills transect survey. The principal forage plants and the extent of animal use are illustrated in Table 2.

Species	Density	Degree of Use
Ribes sp.	Infrequent	Light
Rosa sp.	Infrequent	Light
Juniperus sp.	Common	Light to Moderate
Potentilla sp.	Abundant	Unused

Table 2

A qualitative interpretation of this winter range with regard to availability and degree of use reveals an inverse relationship existing between adequate food supply and starvation. This winter range was likewise subject to mild winter temperatures and diminutive amounts of snowfall.

That malnutrition has attributed to deer mortality on the winter range remains a matter of conjecture. The 46% of dead fawns exhibiting a red gelatinous marrow content gives an indication that a serious depletion of the marrow fat reserve occurred. Analysis of the percentage of other marrow stages, particularly the yellow and white, seems to reveal that other variables tend to stimulate the cause of death. Possibly disease or parasitism play an active role in this type of mortality. Further investigation of this winter range at frequent intervals is imperative so that a more accurate analysis can be derived concerning deer mortality on this type of range.

CONCLUSIONS AND RECOMMENDATIONS:

1. A total of twenty-one dead deer were enumerated on the Blacktail Hills winter range. Thirteen fawns and eight adults comprised the total number of mortalities.
2. Classification of the various stages of femur bone marrow depletion was conducted by use of the Cheatum's Bone Marrow Index Method. Analysis of the fawn mortalities reveals that 46% of the total fawn carcasses exhibited a red gelatinous stage or evidence of serious depletion of the femur fat. Adult carcasses illustrated 62% of the yellow marrow condition or less utilization of the marrow fat. Two adults, however, revealed signs of severe marrow fat depletion.
3. It is recommended that an extensive study be conducted on the Blacktail Hills winter range at frequent intervals, to derive adequate data for accurate analysis of deer mortality and range conditions.

Submitted by George B. Chaffee Approved by Don L. Brown
Date August 3, 1953

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-1-R-12 Work Plan VI Job No. VI-A

Title of Job: An Investigation of the Billy Creek Bighorn Herd

Date: June 16 to 22, 1953

PERSONNEL:

Joe Egan, Junior Biologist
George B. Chaffee, Junior Biologist

OBJECTIVES:

1. To determine the success of breeding and adaptability of the introduced Tarryall bighorns in the Billy Creek region.
2. To ascertain the extent of migration and any factor that might stimulate movement from the enclosure site.

PROCEDURE:

From a base camp at the head of the west fork of Billy Creek, ground surveys were made on the west fork, middle fork and most of the high terrain north to the Fort Peck Reservoir.

By traversing along more accessible north and northeast ridges, several vantage points were reached and vision across the breaks was increased.

FINDINGS:

An investigation was conducted last season at the Billy Creek enclosure site to determine success of the transplanted Tarryall bighorns. The bighorns residing within the 320 acre enclosure for a period of five years have shown a favorable rate of increase and a remarkable response to the new badland type environment. On October 11, 1952, the enclosure fence was removed to allow the increasing herd of bighorns to establish home ranges in the adjoining breaks region within the Fort Peck Game Range.

Subsequent to the removal of the holding pasture at Billy Creek, numerous reports, mainly by stockmen, indicate that a wide dispersal of the released bighorn herd had occurred.

Ranchers in Garfield County recently alleged that a portion of the herd has shifted to the west near the mouth of Squaw Creek and another group of bighorns has been reported to the east near Haxby Point. Migration to the east was evident last fall when a Tarryall ram associated with several domestic ewes at the Hauso ranch which is approximately five miles east of the Billy Creek enclosure site. Early this spring a total of fourteen hybrid lambs were born to the domestic ewes on Hauso's private pasture. Recent reports, however, indicate that eight of the hybrids succumbed to poisonous plant feeding on the private pasture.

The investigation this season was conducted primarily to locate that portion of the Tarryall herd residing within the proximity of Billy Creek and to determine success of breeding and adaptability. A system of traversing along accessible north and northeast ridges overlooking the west fork of Billy Creek and rough breaks north to the Fort Peck Reservoir was used to locate the Billy Creek herd.

A total of twenty-nine bighorns were found in the bad-lands terrain adjacent to the west fork of Billy Creek during a seven day survey. Two groups of ewes and lambs and one group of rams constituted the total number of sheep found during the survey. The total number of sheep observed were classified according to sex as follows:

3	rams
15	ewes
3	yearlings
8	lambs

Although two separate groups of ewes and lambs were observed it is very probable that intermingling occurred due to the short distance between them. Spring lambs accompanying the ewes appeared vigorous and in good body form. Precocity was displayed by the lambs as they followed the ewes over extremely precipitous ridges. The ewe-lamb ratio for the sheep found is 1 to 0.53. A late fall survey when a more adequate number of bighorns can be observed should reveal more accurate herd composition percentages. Yearlings and lambs were not classified as to sex.

A total of three rams were found occupying the same habitat. Two rams appeared to be adult forms with a full curl of the horn. The smaller of the rams displayed only a slight development of the horn. The rams were found on the southeast exposure of a conical shaped hill about one mile east of the enclosure site.

Several ewes were in partial summer pelage with remnants of longer winter hair hanging on posterior sections of the

body. The brownish-gray pelages of the bighorns blended well against the gray-shaly-clay badlands soils. Only by careful scrutiny could the observer detect their presence.

Adaptation to the badlands type habitat appeared favorable. The high breaks occupied by the bighorns seem to offer suitable cover and protection from any form of intruder. The numerous potholes and caves at the base of overhanging cliffs could have served as lambing grounds for the spring lamb crop. Availability of forage appeared abundant throughout the area studied. This excellent condition of the range is attributed to the great amount of precipitation received during the spring. Utilization of browse species was observed on two occasions. One group of ewes and lambs were casually feeding upon the shoots of greasewood (*Sarcobatus sp.*) during an early morning period. Another group of ewes and lambs were nuzzling the dry, terminal end of soapweed (*Yucca sp.*) during an evening period. Unidentified short grasses were also utilized during the evening observation.

The rangeland within the Billy Creek area is subject to range use by limited numbers of cattle and high density of mule deer. Cattle were found only on the valley bottoms near the Fort Peck Reservoir. Deer sign, however, was evident in all elevations in the Billy Creek breaks.

An investigation of the availability of water holes and their relation to the present range of the bighorns was made. Intermittent water holes were present in the coulees, particularly in the west fork coulee near the ridges occupied by the bighorns. The permanence of these waterholes is not questionable. It seems apparent that the intermittent water holes in the coulees cannot provide an adequate supply for a full summer use. A fall investigation should reveal a correlation between the temporary water holes and the home range of the bighorns.

Losses from disease or predation was negligible in the area studied. One mature bobcat was sighted wandering on the sagebrush flat several hundred yards below a group of ewes and lambs but made no attempt to pursue the sheep.

CONCLUSIONS: Preston, Pa. George B. Miller
1. During a seven-day investigation, a total of twenty-nine bighorns were enumerated in the Billy Creek region. Two groups of ewes and lambs and one group of rams constituted

the total number observed. The bighorns observed were classified according to sex as follows:

3 rams - 2 adults and 1 immature
15 ewes - adults
3 yearlings - unclassified
8 lambs - unclassified

The spring lambs observed appeared healthy and vigorous. The ewe-lamb ratio for the total number observed is 1 to 0.53. An autumn survey is recommended when a more adequate number of sheep can be located in order that more accurate herd composition percentages can be determined.

2. Range suitability has been enhanced by the great amount of precipitation received this season. Utilization of two browse species - greasewood (*Sarcobatus sp.*) and soapweed (*Yucca sp.*) - was noted in the area studied. Occasional feeding on unidentified short grasses was likewise observed in the same area.

3. Sporadic water holes were found in the area occupied by the bighorns, but permanence of this water is doubtful. This factor might correlate with the wide dispersal from the former enclosure site.

4. Bighorn losses from disease or predation appeared negligible in the area studied.

RECOMMENDATIONS:

1. It is recommended that an extensive investigation be conducted this fall to determine a more accurate enumeration of the dispersed Tarryall bighorn herd. This survey should cover an area from the mouth of the Musselshell River to Haxby Point, in order that the true extent of the bighorn migration from the former holding pasture can be determined.

2. A winter range inspection should be conducted in the areas of greatest sheep concentration to determine the availability of forage and response to the badlands winter range.

Prepared by George B. Chaffee Approved by Don L. Brown
Date July 15, 1953

STATE	Montana
PROJECT NO.	W-1-R-13
DATE	July 15, 1953
VOL.	IV NO. 2

QUARTERLY PROGRESS REPORT FOR
INVESTIGATIONS PROJECTS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Wildlife Surveys and Management (Western Montana)
2. Personnel: Phillip B. Marshall, Junior Biologist, Leader
Herman Ogren, Junior Biologist
Frank A. Gummer, Senior Fieldman
3. Report of Progress:

Work Plan I: Big Game Population Studies

Job I-A: Big Game Survey in the South Fork of Flathead, Swan, Blackfoot, and Adjacent Areas

Preliminary work began in January with reconnaissance trips to the Swan and Blackfoot areas. These trips were made to determine when deer and elk began to congregate on their winter ranges. The snow cover during January was below normal and concentrations of deer and elk did not occur except in the South Fork of the Flathead. In this area, elk appeared to be well distributed over their normal winter range. However, inclement weather prevented any survey work in that area until March.

Reconnaissance trips made in February in the Swan and in the Blackfoot areas revealed some concentrations of deer on open ground. During the latter part of February and early March, snowshoe trips were made in the Swan Valley. It was found that the white-tailed deer were distributed rather evenly over the whole of their normal winter range. Snow depths varied from twelve to fourteen inches over most of the deer range.

In all areas, some attempts were made to classify deer into groups of adults and fawns. However, very few deer were seen until after mid-February when it was becoming quite difficult to distinguish fawns from adults.

Aerial coverage of the South Fork of the Flathead, Swan, and Blackfoot areas began on February 25 with an early morning flight over the Garnet Range on the south side

of the Blackfoot Valley. Further flying was impossible until March 9 when the work was resumed. The results are tabulated below.

Blackfoot

<u>Area covered</u>	<u>Number of elk seen</u>
Garnet Range	97
Elk Creek	35
Wales Creek	2
Dick Creek	1
Ovando Mountain	162
Cooper Lake	4
Markham Mountain	48
	349

South Fork of the Flathead

Danaher	144
Basin Creek	87
Youngs Creek	88
Big Prairie	80
Gordon Creek	1
Big Salmon River	49
Little Salmon River	15
White River	93
Damnation Creek	199
Meadow Creek	13
Spotted Bear River	19
Gorge Creek	158
Sullivan Creek	44
Twin Creeks	647
Graves Creek	58
	1702

Middle Fork of the Flathead (Schafer)	313
Swan River	81

It is felt that aerial censuses of elk in the Swan Valley are not practical as so much of the valley is very densely forested over most of the range available to elk in the winter.

The mild winter made surveys difficult and few data on which to base management recommendations were obtained. Game animals did not congregate until rather late in the winter when it was difficult to distinguish adults from young or male deer from female deer. In many instances animals were only seen on bare ground so that many of them were probably not seen. In most areas, snow depths did not hinder the movements of animals making it difficult to approach them closely for good observations. For these reasons, no classified counts were obtained.

No instances of winter kill were noted.

Job I-B: Big Game Survey in the Bitterroot, Rock Creek, Fish Creek, Thompson Falls, Cherry Creek and Adjacent Areas

Survey work in this area began on January 23 with an inspection trip to the Girds Creek-Willow Creek area. This area ordinarily winters a fair number of elk and deer. In severe winters and in early spring some damage to haystacks and crop lands occurs. At the time of the inspection trip, there were apparently few elk and deer on the winter range. None were seen and only a very few tracks were observed. This area was not checked again until February 16 when aerial coverage of the Bitterroot began. At this time the elk were on the winter range. Field trips in the East Fork of the Bitterroot were made on February 16, 17 and 18 and in the West Fork of the Bitterroot on February 19. In the East Fork, mule deer were found to be well distributed on the winter range. Snow depths on the upper part of the range were about sixteen to eighteen inches and on the lower part of the range about eight to ten inches. Some southfacing slopes were bare.

In the West Fork, deer did not appear to be concentrated to the extent that they were in the East Fork. However, this may be due to the fact that the West Fork is more densely covered with timber and shrubs and the deer are not as easily observed.

Aerial coverage of the Bitterroot gave the following results:

<u>Area covered</u>	<u>Number of elk seen</u>
Davis Creek to Woodchuck Creek	64
Woodchuck Creek to Burnt Fork	1
Burnt Fork to Skalkaho Creek	209
Skalkaho Creek to East Fork	159
East Fork	353
West Fork	197
Total	982

Return trips from censuses made on the east side of the valley were taken on the west side. Practically no sign of elk was seen and as a consequence no intensive search was made for elk in that area.

No classified counts of deer or elk were made—as in other areas, conditions were unfavorable for obtaining such information.

Cherry Creek and Thompson River

A field trip was made to these areas on January 28 and 29. Snow cover on the stream bottoms was about 8 to 10 inches. Trips were made by truck in Thompson River, Cherry Creek, Prospect Creek and Dry Creek. In none of the areas were the numbers of deer seen comparable to those seen in years of normal snowfall. No concentrations of either elk or deer were seen. Aerial coverage of these areas had been planned but was not accomplished. All available flying weather was devoted to other areas.

Rock Creek

One trip was made to Rock Creek to check on the mountain sheep there. A count of 39 sheep was obtained—the largest number to be seen in a number of years.

Fish Creek

One field trip was made to this area on February 2. There was no snow except on the north slopes and on the tops of the higher mountains. Elk and deer were apparently still on their summer range. No animals were seen and there was no apparent use of the forage on what is normally the winter range in that area.

Work Plan II: Big Game Reproduction, Age Classification, and Hunter Utilization

Job II-A: Age Classification and Herd Rate of Increase

Reported in the October-December, 1952, and January-March, 1953, Quarterlies.

Job II-B: Hunter Utilization

Reported in the October-December, 1952, Quarterly.

Work Plan III: Study of the Migratory Habits of Big Game in Key Areas

Job III-A: Tagging and Release of Elk on the Blackfoot Game Range

Reported in the January-March, 1953, Quarterly.

Job III-B: Tagging and Release of Elk in the Bitterroot

Reported in the January-March, Quarterly.

Job III-C: Tagging and Release of Elk in the Upper South Fork

Reported in the January-March, Quarterly.

Work Plan IV: Range Inspection and Browse Measurements

Job IV-A: Forage Utilization on Key Areas
Inactive.

Job IV-B: Range Condition Survey

During winter big game surveys, observations were made at every opportunity of forage conditions. Due to the mild winter, some winter range was available to the game that ordinarily is not available. This was particularly true in the Bitterroot and Fish Creek areas and to a lesser extent in other areas. In those areas where deer and elk wintered almost entirely on their normal winter range, forage was easily obtained because of the comparatively light snow cover. In most areas, pressure on the forage was lessened somewhat by the wider and more even distribution of game species. No instances of heavy over-utilization of forage were noted although some over-use did occur in the Swan Valley. However, observations were too few to make any conclusions about the amount and extent of the use of forage.

In general, the mild winter relieved the forage of considerable pressure although most ranges are still not in good condition.

Work Plan V: Rocky Mountain Sheep Investigation

A final report is being prepared and will be submitted in a later quarterly.

Work Plan VI: Rocky Mountain Goat Investigation

Job VI-A: Study of Movements and Migrations of Mountain Goats
Inactive during report period.

Job VI-B: Age Determination by Tooth Wear and Replacement
Inactive during report period.

Job VI-C: Sex Ratio and Herd Reproduction Studies
Inactive during report period.

Job VI-D: Study of Mountain Goat Winter Range Distribution
Reported in the January-March, 1953, Quarterly.

Work Plan VII: Aerial Salt Distribution

Reported under Project 26-M.

Work Plan VIII: Characteristics of Natural Licks Used by Wildlife in Montana

Dwight Stockstad's report on "The Chemical Characteristics of Natural Licks Used by Big Game Animals in Western Montana" has been submitted as a separate progress report.

Submitted by:

Name Phillip B. Marshall

Title Junior Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

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STATE Montana
PROJECT NO. W-35-R-4
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT FOR
INVESTIGATIONS PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Southwestern Montana Unit
2. Personnel: J. E. Gaab, Project Leader
Philip South, Junior Biologist
Norman Wortman, Fieldman
Jack Lentfer, Student Assistant
Jack Saunders, Student Assistant
Bill Kezer, Laborer

3. Report of Progress:

Work Plan I: Big Game Population and Range Trends

Job I-A: Big Game Survey of the Beartooth Plateau (Including Boulder River Drainage)

Mule deer and transplanted white-tailed deer range in the Boulder, Stillwater, East Rosebud, West Rosebud Rivers and Rock Creek was inspected this spring. An either sex harvest to last three days, Nov. 1 through Nov. 3, is recommended for this area except the Rock Creek area. It is again recommended to abandon the Box Canyon Closed Area to reduce the competition between bighorn sheep and deer.

Job I-B: Big Game Survey in Absaroka Wilderness Area

The salting program is being continued along the north boundary of Yellowstone Park to entice elk into the Absaroka Wilderness Area. A harvest of three buffalo is recommended for this area.

Job I-C: Big Game Survey in Upper Yellowstone (Winter Range of Northern Yellowstone Elk Herd, Including Park Area)

The mule deer winter concentration in this area is

above capacity. The elk range was used very lightly during this past winter.

Job I-D: Big Game Survey in Gallatin (Including Portion In Yellowstone Park)

The Gallatin winter study was completed for this season May 8, when Norman Wortman began work on Project 57-M. Elk started back to summer range the fore part of April. Late snows retarded their migration and in some cases they returned. There were still elk using the Porcupine Game Range meadows until late April. Some elk calved in Porcupine Creek. The migration to intermediate ranges was very slow due to the cold weather and the range not opening up. The entire winter loss that was recovered was as follows:

	Deer	Elk	Moose
Winter Loss	1	3	2
Road Kill	7	4	
Poachers		5	
Predators	4	3	
Totals	12	15	2

Five hundred eighteen elk were classified including 97 calves, 4 mature bulls, 4 spikes and 413 females. The winter loss of last winter is quite evident by the low number of spikes classified. This classification would indicate a higher annual increase than usual.

Marked elk were observed during the winter but no unusual movements were indicated.

Job I-E: Big Game Survey in Madison

1. Mule deer range and game concentrations were investigated on both sides of the river. Winter loss was low but range deterioration continues.
2. A complete aerial elk census April 12 discovered 260 elk on the east side of the Madison River. They were in the usual concentration area - Mill Creek to South Indian Creek.
3. The range was open enough this season to alleviate damage to private property. One ranch lost some stacked hay. The spring was late and elk remained longer than usual on winter range; by so doing they consumed some early cattle range.
4. The elk on the west side of the Madison were dispersed. A late continuous season until Jan. 31 in the problem area proved satisfactory. About twenty elk were harvested. Some of the troublesome elk wintered on the Ruby River side of the divide, others around the West Fork of the Madison and in smaller groups on the Forest.

Job I-F: Big Game Survey in Ruby

1. Deer investigations are very disheartening. The open winter, allowing a wider winter range, just simply over-used that much more winter range. A very drastic reduction in deer is recommended by an extended season that will tend to concentrate game on the lower reaches of the drainage.
2. Intensive range studies are being conducted in Timber Creek.

Job I-G: Big Game Survey in Blacktail

Elk range inspection with local ranchers revealed a greater spread of elk that extended into haystacks.

Job I-H: Big Game Survey, Beaverhead River Area

Intensive range studies are being conducted on deer range in the Beaverhead River areas. A food habit study is being conducted (Work Plan IV, Job IV-A).

Job I-I: Big Game Survey, Big Hole-Wise River Area

Only general inspections of this area have been made during the quarter.

Job I-J: Big Game Survey, Crazy Mountain Area

1. An intensive study is being made on the mountain goats in the Crazy Mountains. The field work is being conducted by two student assistants working under the supervision of the Senior Biologist for the Unit. Necessary information pertaining to other big game species is being obtained as an incidental aspect of the goat study.
2. The distribution of white-tailed deer from a plant made in American Fork in 1947 has bordered into the the head of Shields River and into Sweetgrass Creek.

Job I-K: Big Game Survey, Big Belt-Boulder Area

Only casual inspections have been made in the Big Belt-Boulder Area during the quarter.

Work Plan II: Big Game Reproduction, Age Classification and Hunter Utilization

1. This portion of the project was inactive during this report period except for information from observations and from trapped and released mountain goats in the Crazy Mountains.
2. A pair of twins were observed in the Canyon Creek Area.

Work Plan III: Study of Migratory Habits of Big Game in Key Areas

Job III-A: Visual Tagging of Calf Elk on the Gallatin-Yellowstone Ranges

Job Completion Report attached.

Job III-B: Tagging and Release of Mature Elk on Gallatin Winter Range
Inactive during report period.

Job III-C: Observation of Elk Migration on Gallatin-Madison Divide
The migration of elk from the Gallatin to the Madison was discouraged last winter. The native elk that winter in the Madison have increased and more definite information as to where they summer is necessary.

Job III-D: Observation of Elk Migration in the Ruby-Blacktail Area
Inactive during report period.

Job III-E: Observation of Elk Migration in the Big Hole-Wise River Area
Progress Report attached.

Job III-F: Manipulations of Big Game Populations
Twelve hundred pounds of salt were dropped from a plane along the north boundary of Yellowstone Park to encourage the migration into the Absaroka Primitive Area.

Work Plan IV: Range Inspection and Browse Measurement as well as Transect and Exclosure Observations

Job IV-A: Forage Utilization on Key Areas
Progress Report attached.

Job IV-B: Range Condition Survey
Refer to Work Plan I.

Work Plan V: Experimental Range Improvement
The experimental range improvement work as outlined under this project will be combined with Project No. W-37-R-5 (Game Range Predevelopment Survey) and reported on by Richard Hodder, Project Leader.

Work Plan VI: Moose Investigation
1. Moose observations during the quarter have been incidental to other jobs, no report completed, for this period.

Work Plan VII: Rocky Mountain Goat Investigation

Job VII-A: Investigation of Planted Mountain Goat Herds in Crazy Mountains
1. A pre-kidding aerial census was made in April.

A total of 244 goats was observed. During the period from the last aerial count two goats had been collected. The present count was 252. A difference in counts of six goats could probably be attributed to winter loss. It was felt even though a classification was made that it is very difficult to separate young from yearlings at that time of the year.

2. Intensive observations of range habits and kidding have been made since June 1st. Three kids are being kept in captivity for close observation of their development.
3. Trapping to mark and release and to get weights and measurements has been slow; nine goats have been caught. Only one trap is in operation. The other trap is too inaccessible by snow to use satisfactorily. Thirty goats will be harvested from this herd this fall.

Job VII-B: Investigation of Native Mountain Goat Herds

The Pintlar and Pioneer Mountain ranges will be censused by air this next quarter. Ten goats will be harvested from each of these herds this fall.

Work Plan VIII: Rocky Mountain Sheep Investigations

All sheep observations during the quarter were incidental to other jobs. Five mature rams with three-quarter curl of horn will be harvested from the Stillwater and Gallatin herds this fall.

Submitted by:

Name J. E. Gaab

Title Unit Biologist

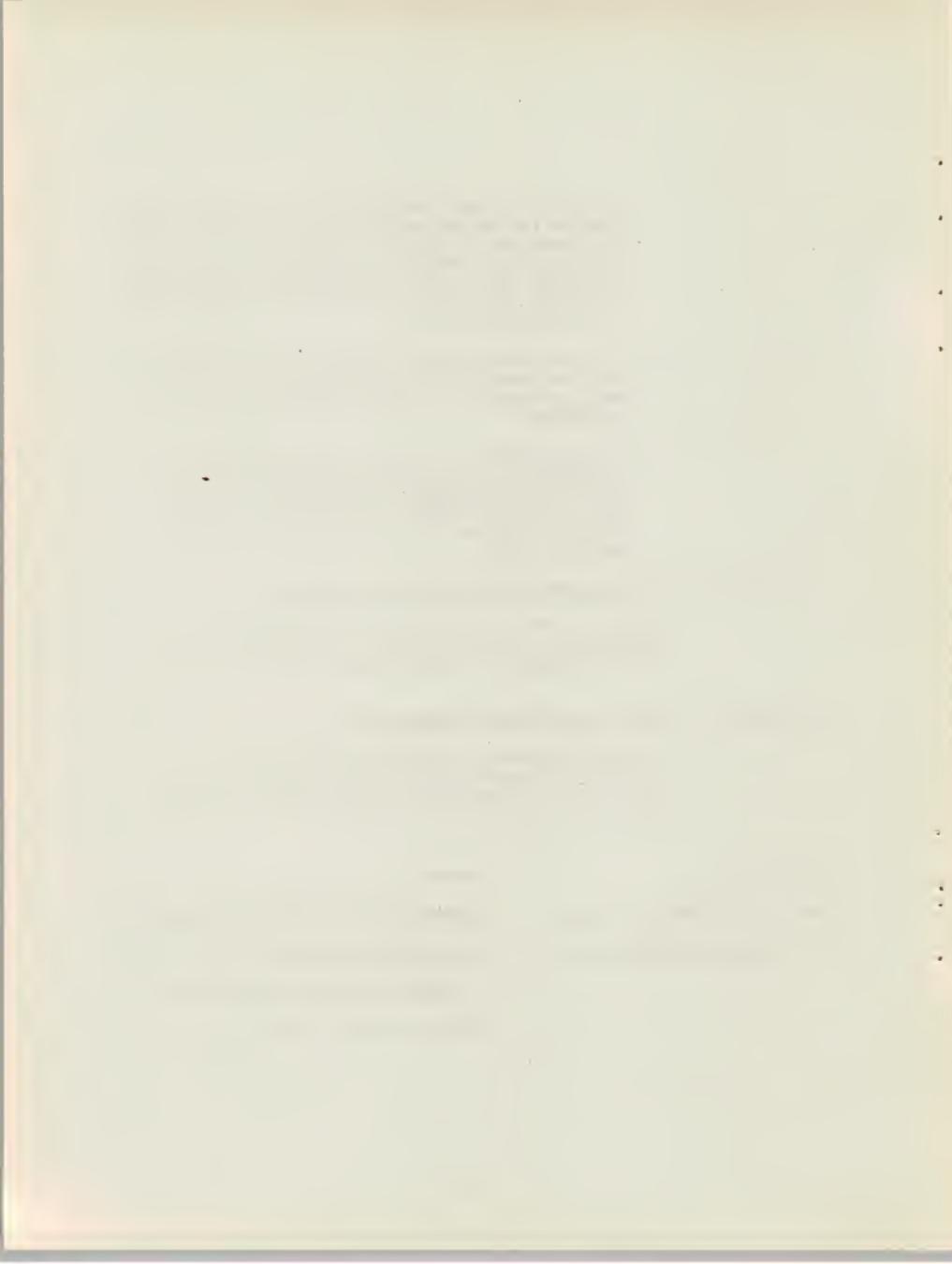
Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-35-R-4 Work Plan III Job No. III-A

Title of Job: Visual Tagging of Calf Elk on the Gallatin-Yellowstone Ranges

PERSONNEL:

Norman Wortman
Bill Kezer
Dick Hodder
J. E. Gaab

OBJECTIVES:

To tag as many elk calves as possible to aid in migration, increase, sex ratio studies and to provide a source of known-age jaws for aging study by tooth replacement and wear.

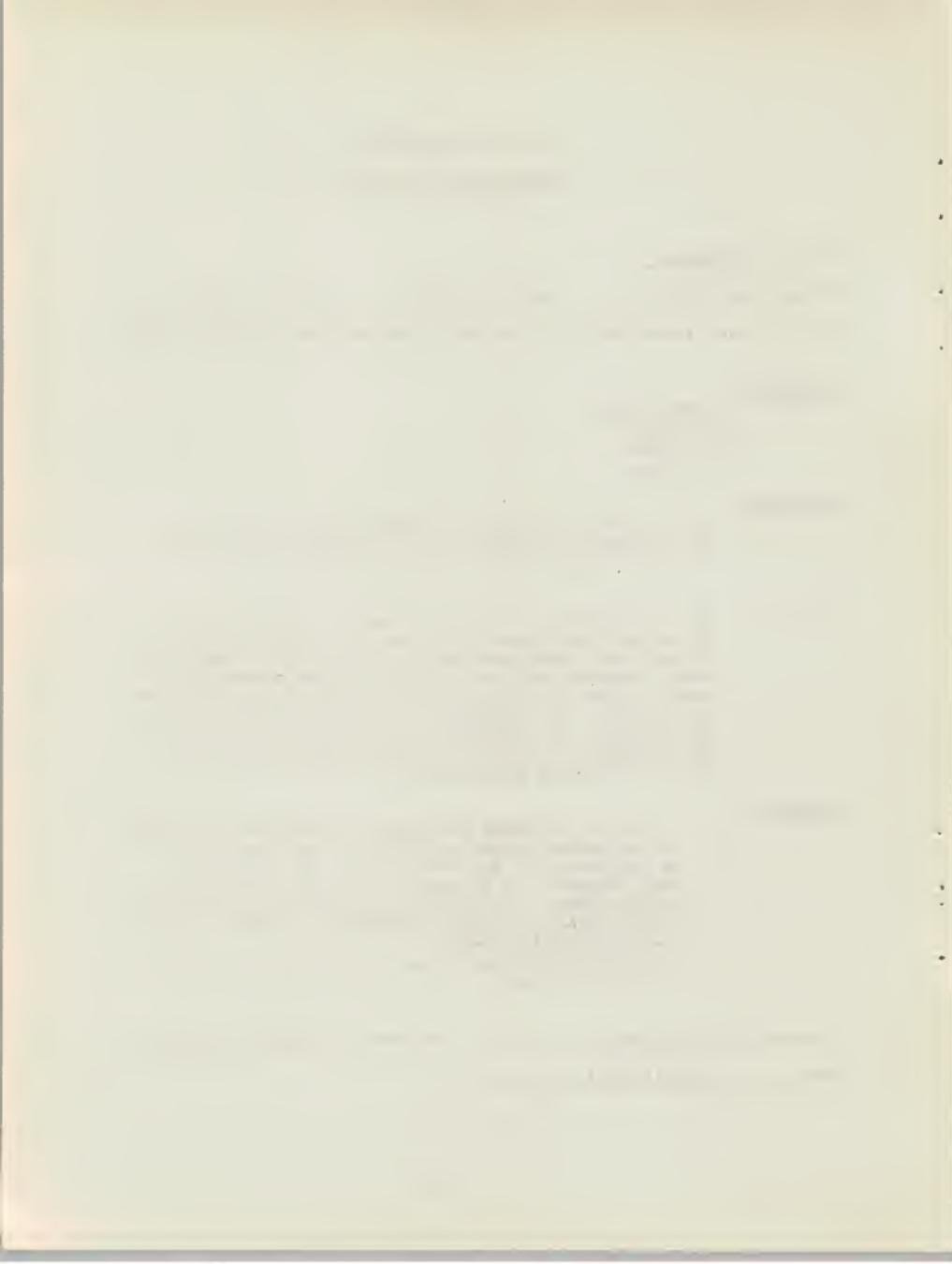
PROCEDURE:

The usual methods of locating and tagging calves were used. The Gallatin Park Ranger Station was used as a headquarters. The only major change was the type of tag. The F. Series tags have an enlarged band that is $1\frac{1}{2}$ x $1\frac{1}{4}$, making a rectangular symbol of light metallic color. This tag is readily seen even at a distance. If an animal loses the tag it will still be earmarked by a slit lengthwise of the ear which is the only way the tag can be torn out. The elk being concentrated by the late developing range was an aid.

FINDINGS:

1. A total of 139 calves were tagged, 72 males and 67 females.
2. Two incidences of bear killing calves were observed.
3. On possible set of twins was tagged. Two calves were found together; one appeared to be an hour or two older than the other. One was still wet and the other had dried without being cleaned-up thoroughly by the mother. Just one cow was at the scene.
4. This was a record catch. Last year's 114 was the record set up to that time.

Prepared by J. E. Gaab Approved by Robert F. Cooney
Date July 15, 1953



PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-35-R-4 Work Plan III Job No. III-E

Title of Job: Observation of Elk Migration in the Big Hole-Wise River Area

OBJECTIVES:

To properly manage any elk herd and be able to set a hunting season and designate hunting areas for this herd, it is necessary to know its migration pattern.

Because of the inaccessibility of much of the Wise River-Big Hole area, it is extremely important to know the migration pattern of the elk in that area to conduct an adequate harvest.

PROCEDURE:

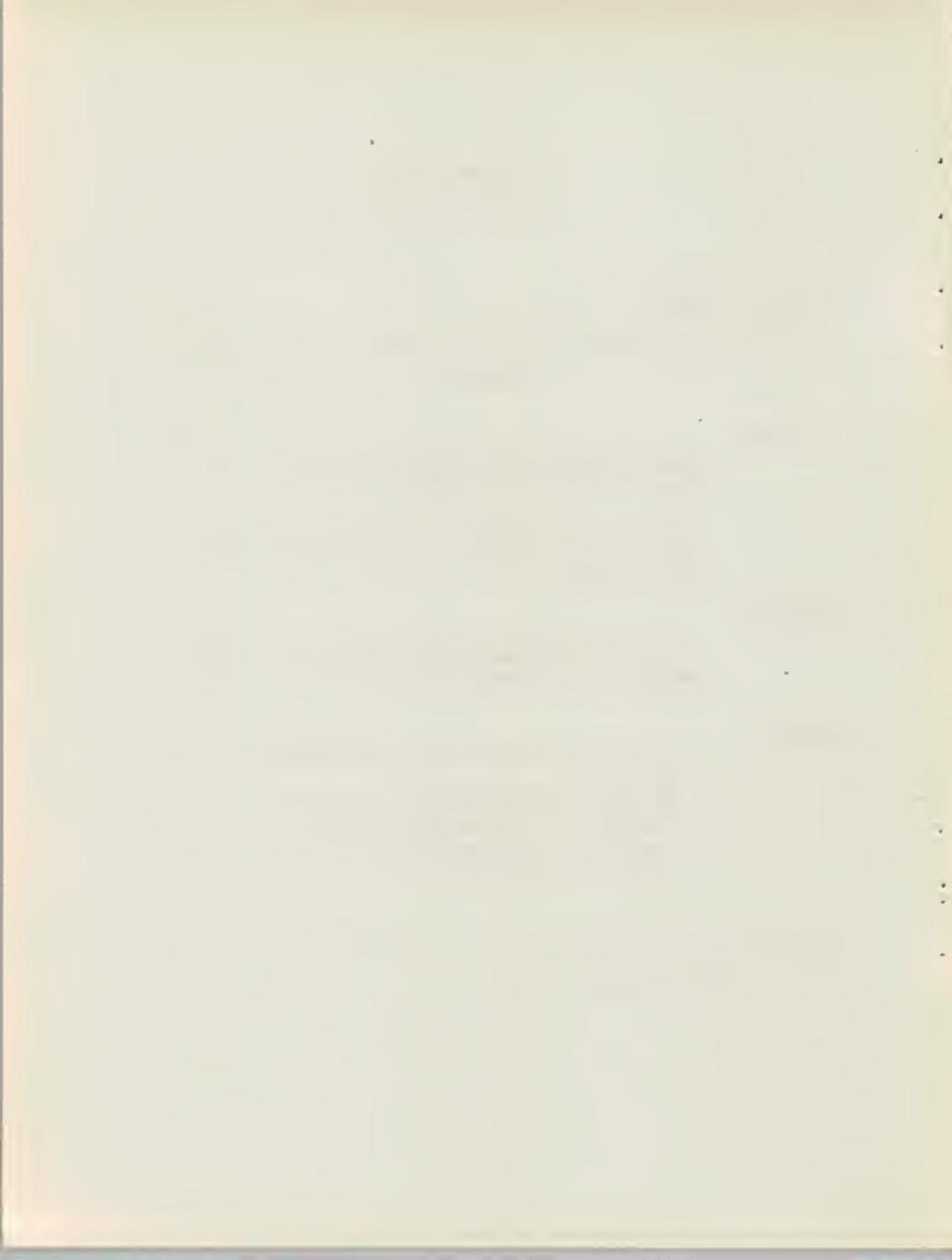
The Vipond Park-Canyon Creek area affords winter range for a sizable elk herd (February ground count—224). Weekly checks are being conducted to determine the movements of these elk.

FINDINGS:

1. The elk herd wintered on the lower open slopes below Vipond Park.
2. By mid-May they were moving up into Vipond Park proper.
3. They calved in the Vipond Park area.
4. A recent trail over the pass from Vipond Park to Adson Creek indicates movement of elk into that area. Adson Creek flows into the Wise River.

Submitted by Philip R. South Approved by J. E. Gaab

Date July 15, 1953



PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-35-R-4 Work Plan IV Job No. IV-A

Title of Job: Forage Utilization on Key Areas

Most of the deer winter ranges in the Beaverhead area are in a critical condition. Heavy populations of deer in some areas have seriously impaired the range. Utilization of these ranges in the summer by livestock as well as their use in winter by concentrations of game have resulted in the destruction of mountain mahogany browse in areas such as Scudder Creek.

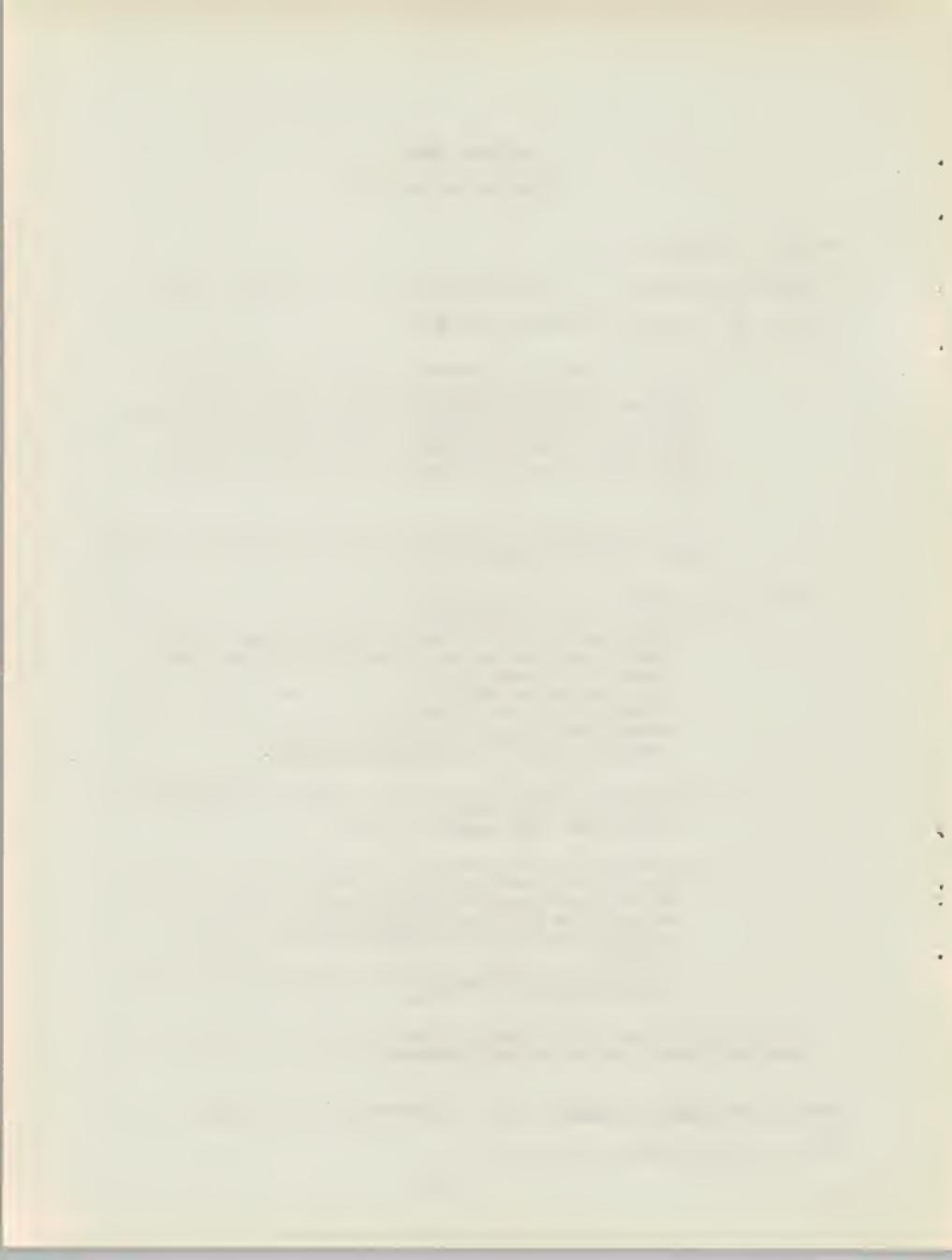
To be able to cope with this situation and to establish the facts as to the condition of the range and the range trend, it is necessary to set up some system for checking and recording range data.

This is being done in the following way:

- A. Exclosures, plots, and transects are being located in the key areas.
 1. Exclosures have been set up in mountain mahogany, sage and rabbit brush areas on both Scudder Creek and Lost Creek areas of the Pioneer Range.
 2. Plots outside the exclosures have been established in areas corresponding to the exclosures.
 3. Transects are being set up in these areas as a check on the data obtained from the exclosures and plots.
- B. A collection of plants from these key areas is being established.
 1. Plants from these areas are being collected, identified, mounted, and filed away for reference.
- C. A special study is being conducted on the food habits of mule deer to determine kind, percentage and preference of food.
 1. Kind and percentages of food utilized by mule deer will be determined by measurements from plots, exclosures, and transects, and also by field observations and stomach analysis.
 2. Preference can be determined by the availability of certain plants compared to the intake.

Other areas included in this study will be Canyon Creek in the Pioneer Range and Timber Creek in the Ruby drainage.

Submitted by Philip R. South Approved by J. E. Gaab
Date July 3, 1953



STATE	Montana
PROJECT NO.	W-36-R-3
DATE	July 15, 1953
VOL.	IV NO. 2

QUARTERLY PROGRESS REPORT FOR
SURVEYS AND INVESTIGATIONS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Lincoln County Deer Management Study
2. Personnel: Robert M. Blair, Project Leader
Owen A. Wilson, Big Game Biologist
D. Patrick Couvillion, Big Game Biologist
3. Report of Progress:

Browse Seedling Study. The primary purpose of establishing this study is to determine if it is feasible to revegetate overutilized winter game ranges by using browse seedlings grown in nurseries. The study is designed to furnish information on methods of planting and on exclosure versus non-exclosure with regard to plant survival where deer damage is heavy. The concern with regard to planting methods is whether it is necessary to remove competing vegetation by scalping prior to planting or whether the seedling can withstand the competition, thus avoiding the time and cost of scalping.

In view of the fact that few seedlings were available from the Forest Service Nursery at Savenac, the study is not as extensive as desired. However, valuable information can be gained with this study until a larger sampling population can be obtained for planting.

Study plots are located within, and at the south end of the Wolf Creek Exclosure and the Wolf Creek Control plots.

A total of 120 browse seedlings, 2/1 nursery stock, were planted on May 11, 1953, with species and numbers as follows:

Mountain maple (Acer glabrum)	23
Mountain ash (Sorbus scopulina)	64
Nannyberry (Shepherdia canadensis)	8
Service Berry (Amelanchier alnifolia)	8
Choke Cherry (Prunus demissa)	17

Seedlings were divided evenly by numbers and approximately by species, 60 being planted within the Wolf Creek Exclosure and 60 within the Wolf Creek Control. A further division, again evenly by number and approximately by species, was then made within each of these two major areas. Within the exclosure 30 seedlings were planted in scalped spots and 30 were planted without eliminating vegetative competition. The latter planting method shall be referred to as "Natural Planting". This same process was also carried out within the control plot.

The separation of seedlings by species and treatments is as follows:

Wolf Creek Exclosure

Species	Planting Method	
	Scalp	Natural
Mountain ash	16	16
Mountain maple	5	5
Nannyberry	2	2
Service Berry	3	3
Choke Cherry	4	4

Wolf Creek Control

Mountain ash	16	16
Mountain maple	7	6
Nannyberry	2	2
Service Berry	1	1
Choke Cherry	4	5

Each study plot is 12 x 40 feet in total size with a buffer zone of three feet between the unit testing scalp spot planting and the unit testing planting where vegetative competition is not eliminated. Scalp spots are approximately eighteen inches square and spacing between seedling rows and seedlings in the rows is 36 inches.

The method of putting the seedlings into the ground was a simple slit made for the roots, followed by repacking the soil firmly around the roots.

The corners and rows of the unit containing scalp spot planting are designated by red-topped survey stakes while the unit containing natural planting is designated by white-topped stakes. This marking arrangement is applied to plot within both the Exclosure and Control.

All individual browse seedlings are marked with yellow metal tags, each bearing a number. This number identifies each plant as to species and location within the study plot.

Seedlings within the Enclosure are protected from deer browsing while those in the Control are subjected to browsing by deer but protected from cattle damage.

Each spring and fall a survival count will be made on the 120 seedlings to determine the affect of scalped spot planting versus natural planting. At the same time the percentage of browsing will be recorded for each seedling within the Control plot to determine the affect of deer damage on survival (enclosure versus non-enclosure).

Browse Reseeding Study. During the fall of 1949 ten species of browse (snowberry, rose, dogwood, service berry, kinnikinnick, trailing hollygrape, mountain maple, choke cherry, bitterbrush, and ceanothus) were planted in four one-acre plots on Wolf Creek and Wapiti Mountain. The seeds were planted in four site treatments representing conditions common to logged off areas. These treatments were: burning, lopping and scattering of slash, scarification, and natural (undisturbed) forest floor.

The entire study was set up in accordance with random experimental design to permit the application of a statistical analysis to the results. Seedling survival counts were taken each spring and fall, and an analysis was applied to the fall survival count of 1952. To date all mathematical calculations for this analysis have been completed, and a detailed evaluation of the results will be submitted at a later date.

Range Condition Investigation. Considerable time has been spent in the field in an effort to determine approximate range conditions and forage utilization as a result of deer use during the past winter. Although the forage on the deer winter range in the Wolf Creek-Fisher River area is still in critical condition, it is believed that browsing in that area was generally moderate due to the mild weather and the more equal distribution of deer over the entire range.

It is believed that our present studies in conjunction with proposed studies will give forth valuable basic data from which many of our deer range problems may be resolved.

Submitted by:

Names: Robert M. Blair

Owen A. Wilson

Titles: Biologists

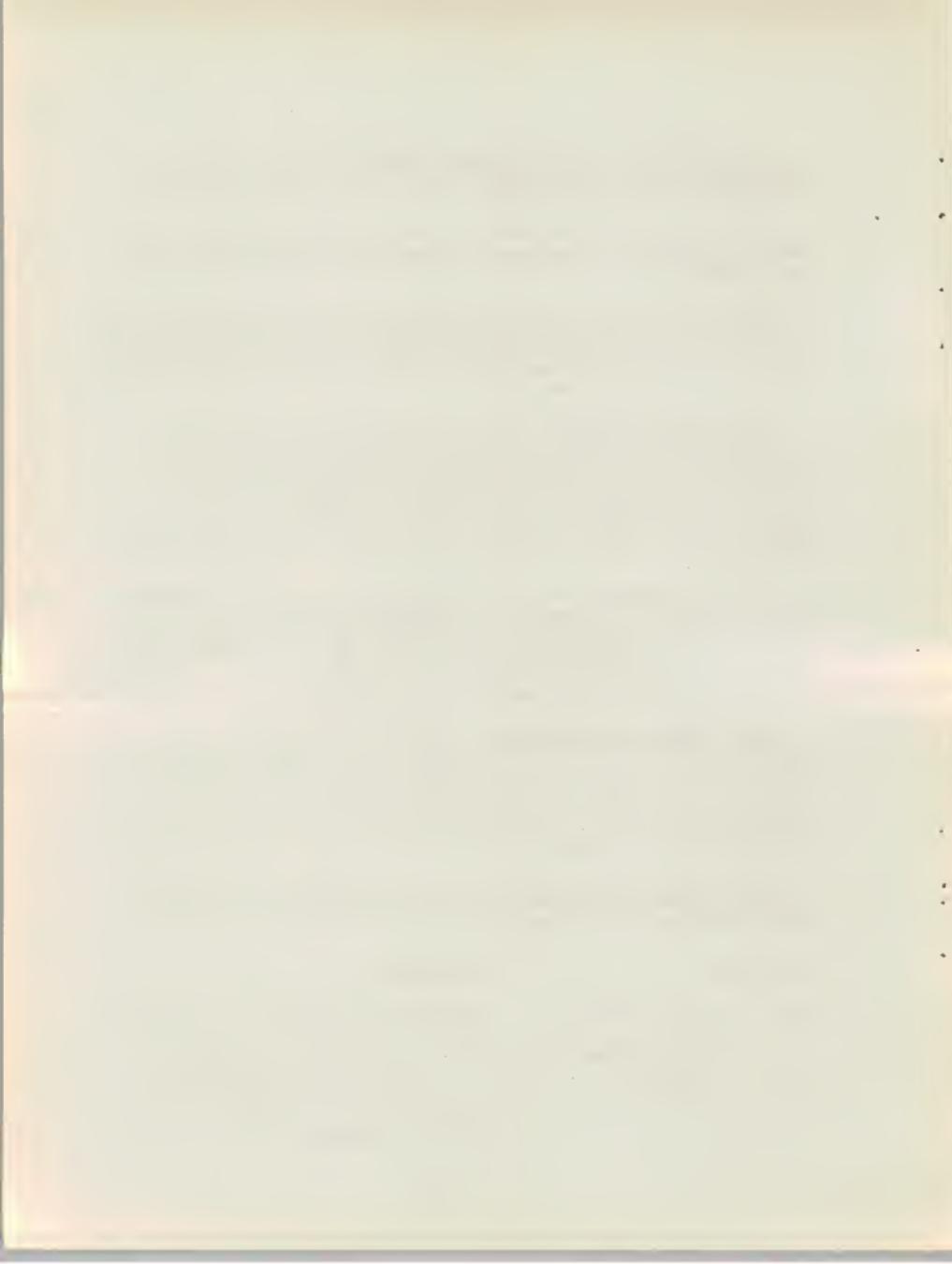
Approved by:

Montana State Department of Fish & Game

By: Robert F. Cooney, Director

Wildlife Restoration Division

Date: July 15, 1953



PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-36-R-3

Work Plan X

Title of Work Plan: Thorough Investigation of Wildlife Resources Within and Adjacent to the Proposed Floodage Basin of the Libby Dam on the Kootenai River in Lincoln County

Waterfowl Study:

The greatest part of the work of this project during this past quarter has been done on a study of nesting areas and game bird counts.

There was a great amount of mating activity along the Kootenai River during the time before the river reached its flood peak for the year (June 15 - 20) by which time nearly all the sloughs adjacent to the river became water courses. The height and speed of the water in these channels made them mostly unsuitable for nesting sites. The ducks that had paired and stayed in those areas had by then left them almost completely and either moved to the area of sloughs and potholes north of Rexford along the Kootenai and Tobacco Rivers, or left this drainage altogether.

Attempts were then made to navigate the channels in the country north of Rexford but with little success. A 12-foot Larsen aluminum boat was used with a 5 horse power Mercury outboard motor but the power of the motor was too little against the current encountered in some of the larger waterways. A larger motor, probably 15 HP, will be tried and should do the job more satisfactorily.

No final count figures are yet available on the duck population in the floodage basin, but it does seem fairly certain that, with the exception of that part of the Fisher River to be flooded and the area north of Rexford, there can be little nesting waterfowl activity through the greater part of the floodage basin along the Kootenai River under the existing conditions.

Construction of the dam would probably provide better (more quiet) water, conducive to duck nesting, but a point arises concerning food supply during nesting. If the rise and fall of

water behind the dam should be acute and great, growth of vegetative duck foods might be curtailed or even stopped due to the precipitous nature of most of the valley walls.

Upland Game Bird Study:

All observations of grouse (the only upland game birds to be found in the floodage basin) have been recorded with place, time and numbers per brood as seen and no attempt has yet been made to arrive at an over-all population figure. When the grouse hunting season is over, an estimate will be given.

It appears now that the populations in this area tend to be substantially greater than last year.

It is notable that the brood sizes as the young approach adult size, show a depletion in ranks great enough to indicate the presence of predation or disease. Predation is suggested more pointedly because some kill remains have been seen and no whole dead birds have been found. There was an abundance of bobcat in the area during the winter and there is not much reason to think they are not present to nearly the same extent now in spite of the fact that they have not been seen in the summer months.

Fur Bearer Study:

Other than observations on all beaver activity, no work has been done on fur bearers during the quarter.

Big Game Study:

All big game seen has been recorded, but a lesser emphasis was placed on this phase except for bighorn sheep.

A consistent search was made for these animals and while a good deal of sign was seen, this observer had little success in finding the animals themselves.

Considerable time was spent flying over the area from Ural to Stonehill, but only six animals were seen during the flights.

Prepared by D. P. Couvillion

Approved by Robert F. Cooney

Date August 9, 1953

STATE Montana
PROJECT NO. W-37-R-4
DATE August 3, 1953
VOL. IV NO. I

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACTS

1. Title of Project: Game Range Predevelopment Survey
2. Personnel: Richard L. Hodder, Range Biologist, Leader
Carter Rubottom, Technical Assistant
3. Report of Progress:

Work Plan I: Gallatin Winter Elk Range

Job I-A: Range (Forage Inventory) Survey
Reports attached.

Job I-B: Forage Production and Utilization Transects

This program was carried out according to plan. Clippings from the transects taken this spring were weighed and the data tabulated. Also, the data obtained from 1950-53 under the intensive clipping system were compiled in an abridged form and then turned over to the Forest and Range Experiment Station at Missoula for statistical analysis. This analysis should show the reliability of this sampling method, a report of which will be in the next quarterly.

Job I-C: Spring Use and Trampling Tests

Discontinued indefinitely until a satisfactory study method is found.

Job I-D: Browse Withstandability Tests

This program has reached the report stage. The report on the five-year study on withstandability of three species in the Porcupine (Gallatin Range) area is to be re-written

for the next quarterly. Browse plants in the Taylor Fork area under study have been increased in number along with those in the Tepee and Porcupine areas. Production and utilization measurements on these shrubs were obtained and data compiled.

Job I-E: Photo Plot Transects (Trend Study)

Inactive during this quarter except for a hurried comparison of photographs. Photographs taken this fall will complete a series of four years of study. This work will be written up for the quarterly during the coming winter season.

Job I-F: Forage Restoration Studies

a. Grass Revegetation

The revegetation program is progressing on schedule. Among other species put out during this quarter was Kochia seed, a palatable and nutritious weed. Grass reseeding plots now number forty, many of which are four years old not including larger plantings of some seventeen other species. Findings from this work will be written up during the coming winter season and a new series started.

b. Browse Revegetation

The data has been received on the callousing and rooting experiment of horizontal juniper cuttings collected last fall. Both rooted and calloused cuttings from one and two year-old growth have been set out for field trials for survival data. Information on this juniper study and on the old man worm-wood study will appear in the winter quarterly.

Job I-G: Weather Data

Information and data were accumulated and recorded according to plan. The U.S. Weather Bureau is setting up a weather station on the Porcupine Game Range, and so it is hoped that a more complete record of pertinent weather data will again be obtained.

Job I-H: Seed Analysis

Data received from the seed analysis at the State seed laboratory (Montana State College), was compiled and this information will be included in the report on Forage Restoration Studies.

Job I-I: Fertilizer Trials

The fertilizer studies on the Gallatin Winter Elk Range have entered a new phase of study. The latin square arrangement as described in a previous report is now complete and is attached. The new approach to the problem is through mushroom rings and their unique effect on the range. Because the mushroom plants produce such a marked growth of forage where there is little growth ordinarily, experimental fertilizer plots were set up across the rings, and fertilizers and plant hormones have been applied to these plots in an attempt to simulate the effects of the mushroom plants. In order to make this study more complete, soil from adjacent to the mushroom rings was hauled from Slide Creek ridge to the greenhouse at Montana State College. There, more intensive work will be done on potted plants, grass in this case, in trying to duplicate the effects of mushroom rings on soil and plant growth by the application of plant hormones and fertilizers. Here in the greenhouse, many factors can be controlled, the most important of which is thought to be water.

Job I-J: Herbarium

The collecting of plants is continuing. The mounting of specimens is behind schedule but will be brought up to date during a more slack period. Herbarium cabinets are still ordered but not yet received. This group of important plant species from our game ranges will be located in the Fish and Game library in Helena for all to use as soon as the cases arrive.

Job I-K: Stomach (Paunch) Analysis

Inactive until information is received on the reliability of the identification of constituent parts.

Work Plan II: Sun River Winter Elk Range

Job II-A: Winter Elk Range Examination

This job was not completed because of very freakish winter weather. There was only one major storm of the whole winter, and this one came during early spring and was not typical of winter storms in any sense. This job will have to be done during the coming winter as it is essential that this important information be obtained.

Job II-B: Photo Plot Trassects (Trend Studies)

This job is scheduled for the fall quarter.

Job II-C: Range (Forage Resource) Survey

The tracing of the game range survey map was made for the Sun River Game Range and those lands to the south as far as Ford Creek. This tracing was basic in getting the blueprint copies of the same area which are now checked and colored for use. A field map for general use has already been completed from this survey map. This map has on it the precise location of many roads, fences, buildings, and other important features. The area to the north of Sun River will be completed during the coming quarter, filling in the one remaining area subject to heavy elk use by this herd. The type key for the area already completed (more than two townships) is finished. The clipping of the grass types necessary to determine the weight of forage production on the range will be completed during the coming quarter, and the whole project completed early this winter.

Work Plan III: Blackfoot-Clearwater Game Range Studies

Job III-A: Forage Evaluation and Nutrition Studies

Compilation of data, and information and observations of the last series of feeding trials is on hand. It has not yet been worked up and arranged for release. These feeding trials have produced much important information on the nutritive values of some of our native feeds. This information will be made available during the slack fieldwork period of the coming winter.

Submitted by:

Name Richard L. Hodder

Title Range Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date August 3, 1953

PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-37-R-4 Work Plan I Job No. I-A

Title of Job: Range (Forage Inventory) Survey

Subject: A Comparison Between the Area of "Sore Spots" and Bare Knolls to the Area of Critical Winter Range of the Gallatin Elk Herd

PURPOSE:

It has often been asked what part of the Gallatin elk winter range is represented by the conspicuous clay slopes, gumbo knolls, and steep eroding hillsides, which are so evident from the highway passing through the elk winter range. How typical are these areas of the critical winter range of which they are a part, and what proportion of the winter range is in such condition as these slopes represent? The frequency of this type of question leaves little doubt that in the mind of the general public an erroneous impression has been imbedded. It is the purpose of this paper to answer some of these questions and perhaps clear the impression that such poor range condition is general over the elk winter range as a whole.

PROCEDURE:

The source of the information and data which is included here is from the range survey maps made by the State Fish and Game Department, and from overlays showing the limits of winter range use during the last ten years.

FINDINGS:

The following data represent the average number of acres of range used by elk during the winter months through the last ten year period.

December	45,944 acres
January	31,564 acres
February	31,206 acres
March	24,660 acres

In comparing the total area of "sore spots" of this winter range to that total acreage used during the average winter month, all open types with a density less than 15% were listed, totaled and considered as problem areas, even though in some instances this is obviously not the case. At this point it is well to say that one of the many purposes and uses of this range survey work was to provide such acreages as these. Field typing was accurate and fine enough to separate low density spots even though they were engulfed by larger similar vegetative types but of greater density.

The total of all of these types of low density on the whole winter range is 926 acres. This figure includes all areas from West Fork south to Specimen Creek in Yellowstone National Park. It includes all areas of low density up side drainages of the Gallatin River such as Porcupine, Taylor Fork, Tepee and Daly Creeks, and not just those outstanding areas in view from the highway.

As a percentage figure of the whole, this total of 926 acres is 2.1% of the range used during the average month of December, and 3.8% of the area used during the critical average month of March.

These figures show that the "sore spots" which appear on the elk winter range are only a very small part of the area used by elk during the winter months, and that these areas of low density are not typical of the winter elk range as a whole, although they are included in this winter range area.

Submitted by Richard L. Hodder

Approved by Robert F. Cooney

Date July 15, 1953

COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-37-R-4 Work Plan I Job No. I-I

Title of Job: Affects of Fertilizer Trials on the Gallatin Elk Winter Range

INTRODUCTION:

Many of the soil characteristics of the Gallatin elk winter range indicate that perhaps applications of various fertilizers might be of benefit in promoting plant vigor and reproduction, thus increasing soil stability and water infiltration, and preventing excessive erosion.

This generally unstable area, as is evidenced by classical examples of geological erosion, has been aggravated through the years by sheep, cattle and elk use, and with this use many exposed hillsides and ridges have become nearly denuded, void of sufficient organic material and nutrients necessary for satisfactory forage production.

Soil samples, such as the one show on the next page, indicate the need of soil rebuilding. The lack of viable seed produced by plants on these areas year after year indicates perhaps a mineral deficiency exists that has retarded successful forage reproduction that might be corrected by soil fertilization. One extremely interesting indicator that production might be markedly increased is the presence of "Mushroom Rings." These rings are outstanding because of the abnormally heavy growths of forage produced in long arcs and rings many times running through apparently sterile sites. These growths of grass and weeds are invariably spotted with mushrooms during the early growing season. It is not understood just how the underground part, or mycelium, of the mushroom plant causes this unusual effect, but it has been assumed that a readily available form of nitrogen is released from the disintegrating mycelium and the nitrogen makes this unusual growth possible.

Soil Samples from Gallatin Elk Winter Range

Analyzed by Montana State College December 1948

Sample No.	Soil Type	Organic Matter (%)	Nitrogen (%)	Moisture Equivalent (%)
BH-1	C	2.6	0.19	17.2
D-1	C	1.4	0.07	10.6
M-1	C	1.9	0.11	18.7
M-3	C	2.0	0.12	18.5
P-1	C	3.4	0.20	16.6
P-4	C	2.8	0.17	20.3
T-1	C	3.1	0.19	19.0
T-3	C	2.6	0.20	21.2
Daly Creek	C	3.7	0.21	19.0

PURPOSE:

For the afore mentioned reasons, an experiment in the use of various common fertilizers was designed in the hope of finding one or a combination of elements that would promote forage growth on the presently low producing areas.

METHOD:

A southern exposed gentle slope at the top of a knoll, approximately 6300 feet in elevation, up Porcupine Creek was selected for the site of the experiment. This location was chosen because of its availability, its similarity to other typically exposed areas nearby which are low producing sites, its seemingly consistent soil, and because the vegetation on the area was composed of a variety of grasses and forbs of even density. This last requisite was necessary, though not typical of the usual "sore spots" on the winter range, because the degree of success in this experiment was to be measured by the visually apparent response of the vegetation within the plots, thus making the presence of a variety of species of even density desirable.

After careful consideration of the properties of the various common fertilizers, it was decided that the testing area should be divided into a latin square arrangement so as to allow a side by side comparison of the four elements thought to be most essential for both forage and seed production. The four elements were nitrogen, magnesium, phosphorus and potassium. Sulphur was not considered essential to production in this area but because it was available in combination with two of the other desired elements, it too was tested. Easily obtained fertilizers containing the desired components that were used are as follows:

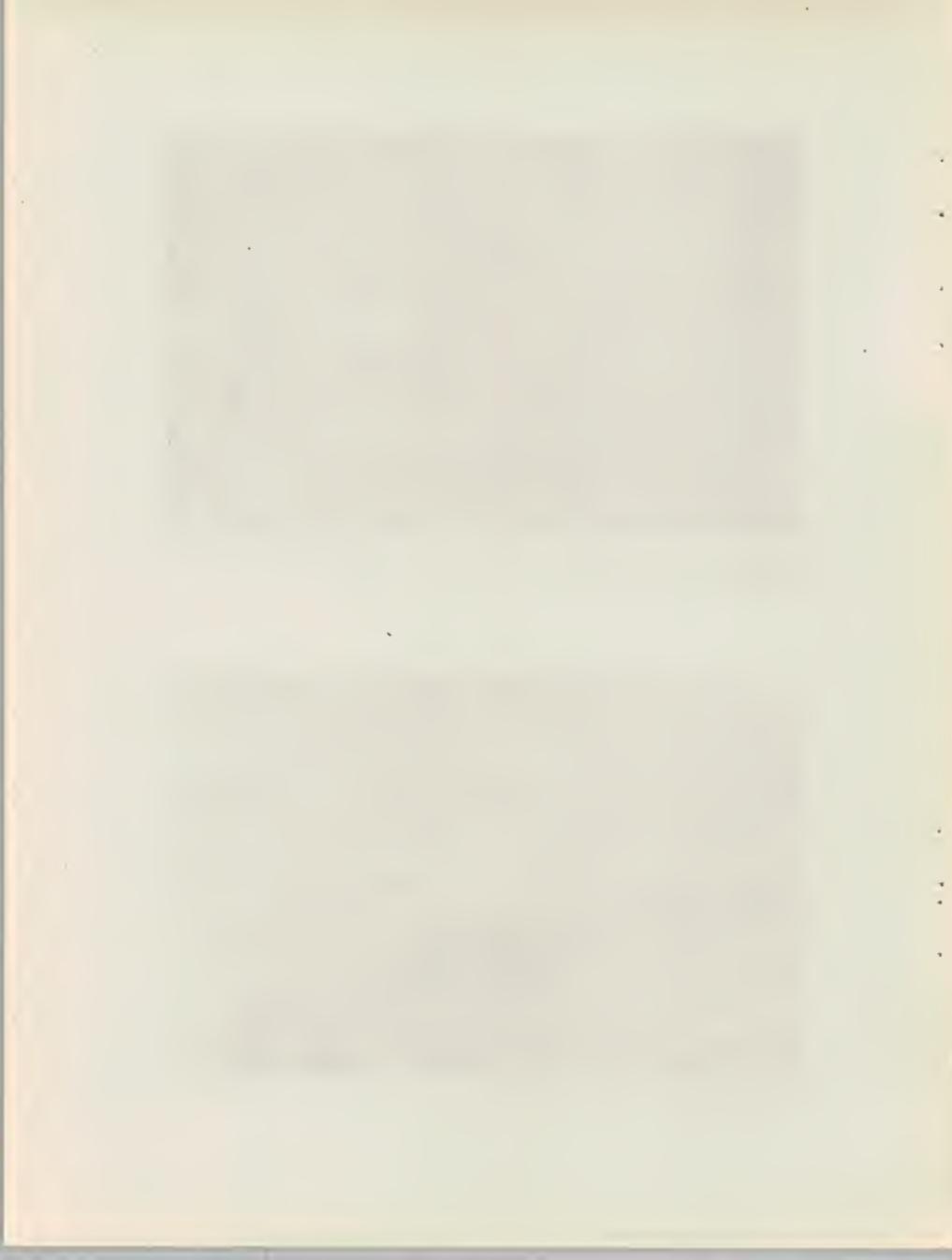
Nitrogen - - - Ammonium sulphate $(\text{NH}_4)_2\text{SO}_4$



Close-up of good production of grass on low density range. Good growth is in mushroom rings. Slide Creek 1948.



Close-up of mushroom ring showing old growth from last year and durrent growth. Taylor Fork 1948.



Phosphorus - - - Treble superphosphate P_2O_5

Potassium - - - Murated Potash KCl

Magnesium - - - Magnesium sulphate $MgSO_4$

Sulphur - - - Ammonium sulphate
Magnesium sulphate

The testing plots were laid out in the following latin square arrangement so that the effects of the five elements plus ten of their combinations could be tried at one time. These were: N, Ng, S, P, K, N + K, N + P, N + Mg, N + S, Mg + K, Mg + P, Mg + S, P + K, P + S, K + S.

N(+S)		Mg(+S)		Check		P		K	
K								K	
P								P	
Check								Check	
Mg(+S)								Mg(+S)	
N (+S)								N (+S)	
N(+S)Mg(+S)		Check		P		K			

This arrangement offered a system of check plots including those without fertilizer, those with measured single applications, and those with measured double applications of the same fertilizer or combinations of fertilizers. It also provided a duplication of each of these intensities as a check of one plot against another similarly treated one.

Fertilizers were applied at the following rates by rows so that the intersections of identical rows would get a double concentration:

Ammonium sulphate - - - - - 100 lbs per acre

Treble superphosphate - - - - - 200 lbs per acre

Potash - - - - - 150 lbs per acre

Magnesium sulphate - - - - - 300 lbs per acre

The dimensions of the whole latin square were 40 ft. by 40 ft. and the size of each plot measured 8 ft. by 8 ft. It was considered

unnecessary to leave an aisle separating the various plots as previous work by the College suggested that the washing effects were negligible on a reasonably level location.

Stakes were placed for marking the four corners of each component plot and other stakes were painted white and labeled with the name and symbol of the various fertilizers concerned and then placed at the ends of each of the rows so that at a glance one could tell what combinations of elements were in each component plot.

Because it would be impractical to apply fertilizer to the range in any other manner but by broadcasting, it was decided that it should be applied in this same way to the testing areas instead of drilling it into the ground as is usually recommended under farming procedures.

It was also thought that if results were not visually perceivable in forage and seed production, that the application of fertilizer would be considered ineffective and unsuccessful. For this reason, no minute measurements were taken of the vegetation within the area. Instead, photographs were taken of the testing square from several designated points so that a complete before-and-after record was obtained.

The fertilizers were applied in early June, 1949, while the ground still contained much moisture. At this elevation, early June is still spring and with it are the usual spring showers and snow flurries. Other than the application of the fertilizers, the testing site was subjected to no artificial conditions or treatment.

FINDINGS:

The results of these trials were definite. Differences between the various plots were not discernable. There was no apparent change in any of the plots nor in any of the species of vegetation when compared to adjoining plots or to check plots, or to the vegetation outside the experimental area.

This whole experiment was repeated in the spring of 1950 in an identical manner. Again there were no visually detectable differences between any of the plots.

The area was not treated the following season and observations were made that fall to record residual affect, if any. Again there were no discernable differences between plots.

Porcupine Game Range
fertilizer plots showing
Latin Square arrangement
1949



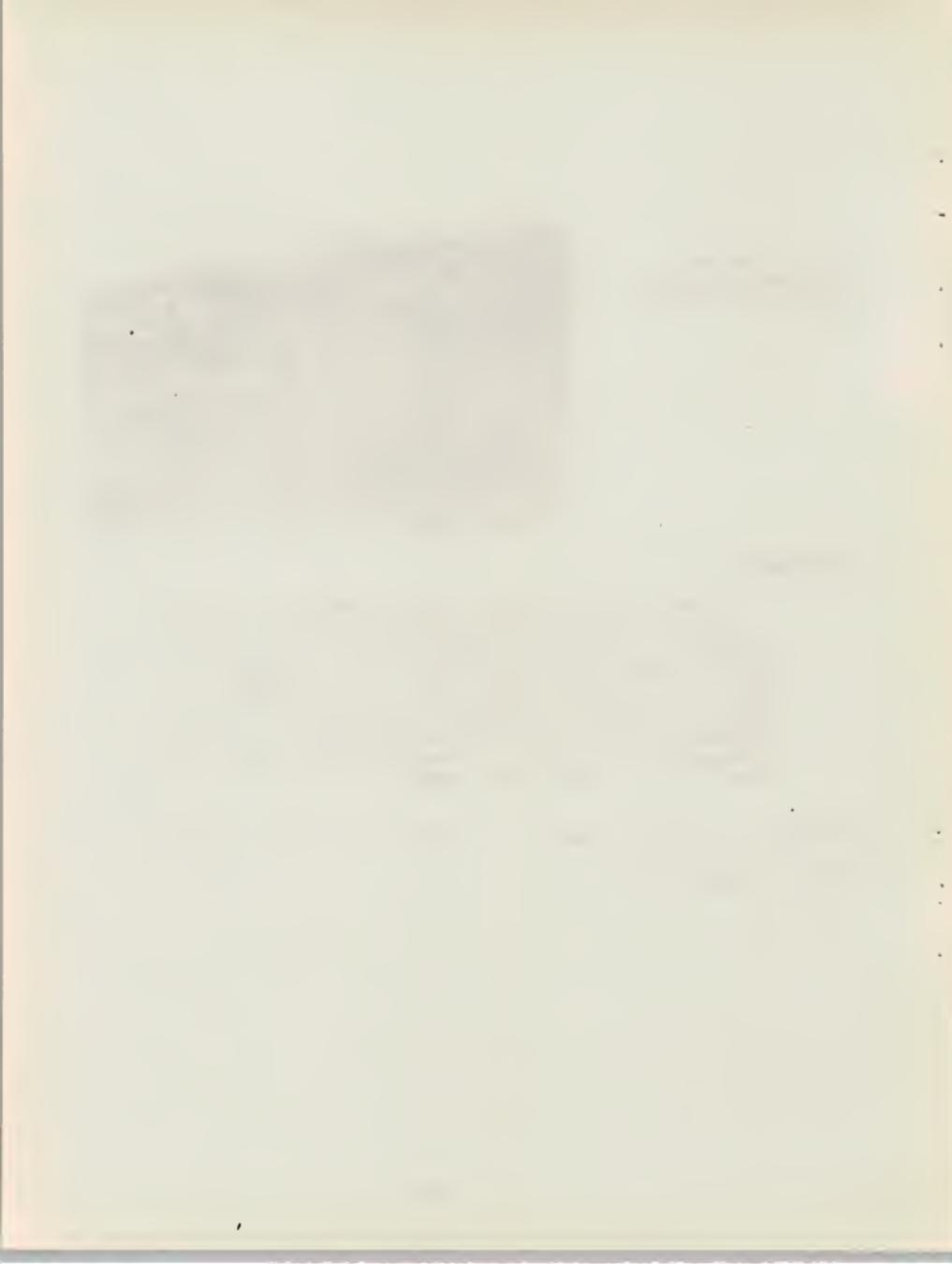
RECOMMENDATIONS:

It seems probable that some factor or combination of factors has prevented these fertilizers from causing some marked effect on the growth of the vegetation in the study area. The most logical assumption seems to be lack of adequate moisture at the proper time or for a sufficient length of time. It is recommended that this experiment be repeated as before, but that the fertilizers be applied as soon as the testing area is clear of snow and free from the effects of spring run-off. It is also suggested that the experimental site be changed to an area where mushroom rings produce marked increases of vegetational response.

Submitted by Richard L. Hodder

Approved by Robert F. Cooney

Date July 15, 1953



STATE	Montana
PROJECT NO.	W-38-R-4
DATE	July 15, 1953
VOL.	IV
NO.	2

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Upland Game Bird Surveys and Investigations
2. Leader: William R. Bergeson, Biologist
3. Report of Progress:

Work Plan I: Ring-necked Pheasant Survey and Investigation

Job I-A: Pheasant Breeding Populations
Completion report attached.

Job I-B: Sex Ratios and Hunter Harvest
Inactive during report period.

Job I-C: Post Card Survey
Inactive during report period.

Job I-D: Pheasant Mortality
Compilation of data in progress; completion report will
be submitted when data warrants.

Work Plan II: Survival of Game Farm Reared Exotics

Job II-A: Survival Value of Game Farm Reared Pheasants
Inactive during quarter; summary report submitted in
March, 1953, Quarterly.

Job II-B: Survival Value of Chukar Partridge
Progress Report attached.

Job II-C: Survival Value of Valley Quail
Inactive during quarter.

Work Plan III: Ring-necked Pheasant Ecological Survey - Flathead Valley

The final report submitted to Portland for review was returned with criticisms and suggestions for making it a better report and is now in the process of revision along the lines suggested.

Work Plan IV: Pheasant Habitat Development Investigation

Inactive during report period.

Work Plan V: Prairie Grouse Management Study

All jobs under this study are in progress and will be reported on when data on findings warrant.

Work Plan VI: Mountain Grouse Management Study

A comprehensive report summarizing ten years of mountain grouse work in western Montana has been submitted. This report is being edited and will probably be included in a later quarterly.

Job VI-A: Range and Relative Abundance

Inactive during report period.

Job VI-B: Experimental Management Studies

Progress Report attached.

Job VI-C: Ecology and Life History

Data is gathered whenever possible and findings will be submitted when warranted.

Submitted by:

Name Wm. R. Bergeson

Title Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-38-R-4 Work Plan I Job No. I-A

Title of Project: Pheasant Breeding Populations and Production

OBJECTIVES:

To determine spring breeding populations, population trends and distribution in the major pheasant producing areas of Montana.

TECHNIQUES USED:

Routes established in previous years were retraced on or near the same date and the number of cock pheasant heard crowing during a two-minute listening interval were recorded for each listening station; in addition, several new routes were established.

The standard procedure used is as follows: Begin all routes thirty minutes before sunrise, stop car, shut off motor, get out and walk a few yards away, count and record all cock calls heard during a two-minute listening period, drive on one mile and repeat procedure. Continue for ten to twenty stops. In some pheasant areas where the habitat is limited, more than ten stops are not feasible.

FINDINGS:

Bitterroot Area

A 21.8% increase in the 1953 cock pheasant population in the Bitterroot Valley was noted when compared with the 1952 index. Two new routes were added for which there is no comparative data; therefore, these routes are not included in the 1953 average.

Table I. Pheasant Crowing Count - Bitterroot Valley

Route	1949	1950	1951	1952	1953
Lower west side	10.3	10.7	11.8	8.5	14.7
Lower east side	26.5	29.7	21.2	18.0	19.6
Upper west side					11.1*
Upper east side					20.6*
Averages	18.4	20.2	16.5	13.3	17.2

* - Not included in average

Kalispell Area

A 9% increase in the cock pheasant crowing index is indicated in 1953 and represents the highest average attained since crowing counts were started five years ago.

Table II. Pheasant Crowing Counts - Kalispell Area

<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>
19.6	24.8	20.9	25.1	27.9

Frenchtown Area

A 50% increase was observed in the Frenchtown area west of Missoula in 1953 compared with the 1952 index.

Table III. Pheasant Crowing Counts - Frenchtown Area

<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>
10.5	12.4	10.2	10.0	15.1

Flathead Valley

A 7% decrease in the crowing index for the Flathead Valley was noted. The route averages varied inversely from last year's results and were not greatly different than those obtained in 1951.

Table IV. Pheasant Crowing Counts - Flathead Valley

Route	1948	1949	1950	1951	1952	1953
1	27.5	29.6	29.8	53.3	42.2	47.3
2	44.0	41.0	30.2	42.3	54.6	43.4
Average	35.8	35.3	30.0	47.8	48.4	45.4

Fairfield Area

The number of cock calls increased slightly from an average of 22.2 calls in 1952 to 24.1 calls in 1953. A severe hailstorm occurring at 1:30 a.m., May 27, 1953, traveled northeasterly through the north end of the project and through which Route #2 lies in part. This storm was severe enough to dent automobile bodies, break windows and damage roofs on houses in Fairfield. This storm probably killed many birds in the area affected since a crippled cock, two dead hen pheasants, a dead pintail drake and a dead jack rabbit were found during a two-mile walk through the storm area northwest of Fairfield. Observed spring sex ratio was found to be 6.6 hens per cock which is again comparable with that of 1952 when the ratio was 6.9 hens per cock.

Table V. Pheasant Crowing Counts - Fairfield Area

Route	1948	1949	1950	1951	1952	1953
1	30.9	38.1	24.3	54.8	20.8	30.3
2	27.9	30.0	29.6	53.3	23.6	18.0
Average	29.4	34.0	26.9	54.0	22.2	24.1

Conrad Area

The crowing count index decreased 16% from the 1952 average of 33.8 calls per two-minute period. The observed spring sex ratio in 1953 was observed to be 6.2 hens per cock compared with the 1952 ratio of 5.5 hens per cock; this, in turn, probably reflects the reduction accomplished by heavy hunting pressure during the 1952 season this this popular area.

Table VI. Pheasant Crowing Counts - Conrad Area

Route	1949	1950	1951	1952	1953
1	27.9	24.8	28.9	32.0	18.0
2	53.6	42.2	51.9	35.9	38.9
Average	40.7	33.5	40.4	33.8	28.4

Billings Area

Crowing counts indicate the index to be nearly the same as in 1952 and may indicate a leveling-off in the decline experienced since 1948.

Table VII. Pheasant Crowing Counts - Billings Area

Route	1948	1949	1950	1951	1952	1953
2	18.0	11.5	—	11.4	7.0	7.8

Hardin Area

Crowing counts in this area were conducted at a more optimum time compared with previous years when the counts were conducted too late in the season to coincide with maximum crowing intensity and may, in turn, account for the increase noted this year.

Table VIII. Pheasant Crowing Counts - Hardin Area

Route	1948	1949	1950	1951	1952	1953
1	15.3	17.4	—	19.1	11.3	17.8
2	—	23.9	—	8.8	10.3	18.0
Average	15.3	20.6	—	13.9	10.8	17.9

Milk River Area

Counts conducted in the Malta area indicate a satisfactory build-up in cock pheasant populations compared with 1952 when severe floods affected the entire Milk River Valley; this may be due in part to the large releases of game farm reared birds from the Fort Peck Game Farm. In 1952, the entire production of this farm, nearly 12,000 birds, was released throughout the length of the Milk River Valley from Havre to Glasgow and in the counties eastward from there north of the Missouri to the North Dakota boundary.

Table IX. Pheasant Crowing Counts - Milk River Valley

Route	1950	1951	1952	1953
Malta-Dodson	16.5	29.6	12.5	27.5
Malta-Beaver Cr.	33.1	—	—	19.5
Malta-North	—	—	—	11.5
Average	24.8	29.6	12.5	19.5

Helena Valley

A slight decrease in the number of calls per two-minute period was again noted in the Helena Valley in 1953, averaging 12.5 compared with 13.5 a year ago.

Table X. Pheasant Crowing Counts - Helena Valley

1948	1949	1950	1951	1952	1953
10.7	15.3	12.2	15.0	13.5	12.5

Other Areas

A number of routes established in 1951 were retraced and several new routes were added in 1953. Those stations for which comparative data are available showed an increase which possibly could be attributed to coinciding the counts more nearly with maximum crowing intensity.

Table XI. Pheasant Crowing Counts - Other Areas

Route	1951	1952	1953
Broadwater #1	15.4	12.5	21.9
Broadwater #2	32.0	25.7	31.3
Beaverhead	13.2	11.7	13.9
Forsyth	25.4	19.0	29.4
Treasure County	—	—	28.0
Wheatland County	—	—	3.9
Fergus County	—	—	5.6

CONCLUSIONS:

Crowing count data for the more important Montana pheasant ranges in 1953 do not differ greatly from that obtained the previous year. However, the three major hunting areas - the Flathead Valley in Western Montana and the Fairfield and Conrad Areas - show slight declines, while most other areas show increases. This, in turn, may reflect increased hunting pressures and resultant reduction of cock populations in the three above mentioned areas, while other pheasant producing areas may have had insufficient hunting pressure exerted. Certainly, the 1952-53 winter and following spring were not adverse to pheasant populations in that no severe storms, excessive snowfall or prolonged cold periods were experienced.

Submitted by:

Name Wm. R. Bergeson

Title Senior Biologist

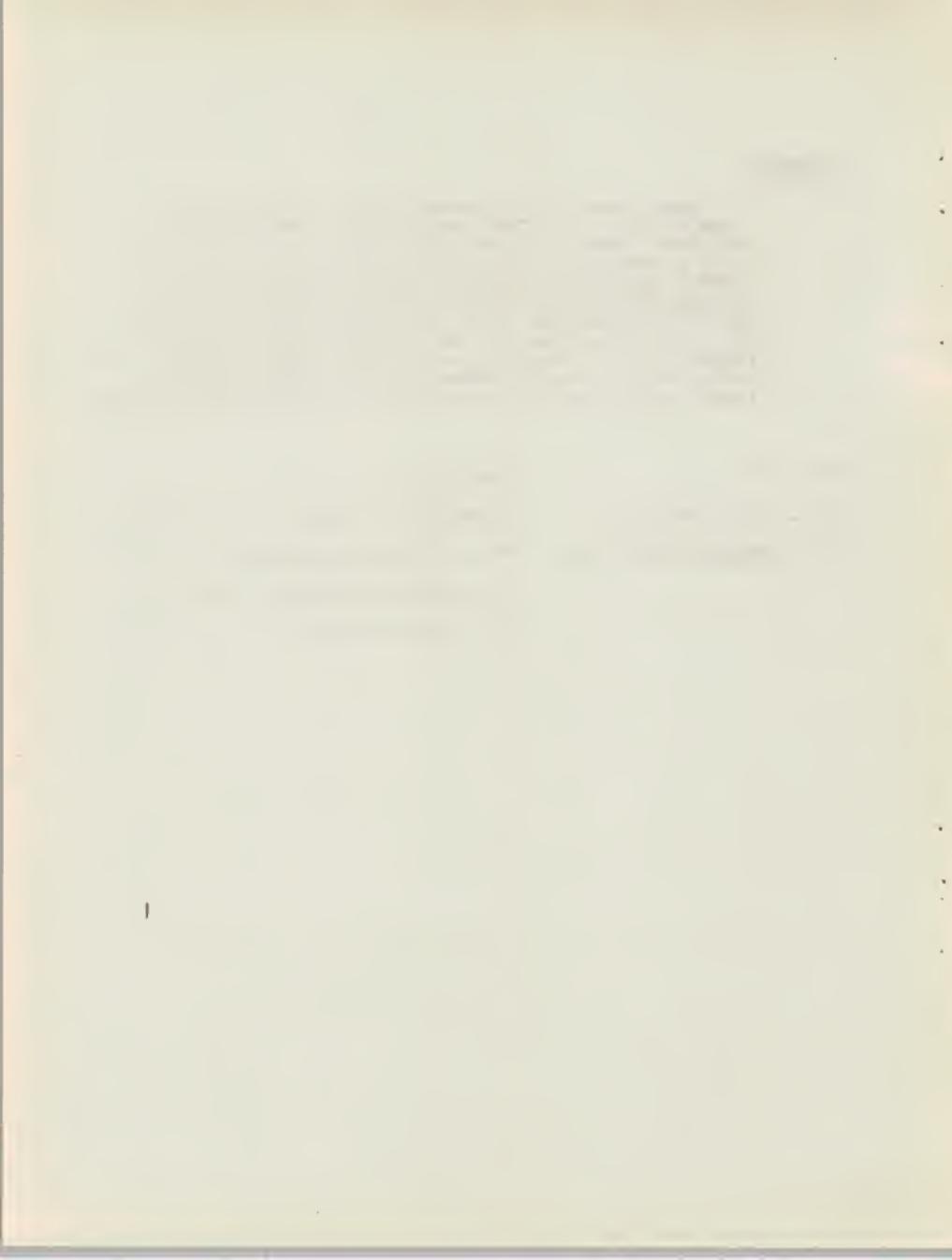
Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-38-R-4 Work Plan II Job No. II-B

Title of Job: Survival Value of Chukar Partridge

Ninety-five chukars were released in the Lime Hills near Townsend on the 23rd of March. This area was visited on the 14th of April and the birds were found to be scattered around the vicinity of the release point. They were in pairs and seemed to have territories established. Proximity to water does not seem too important at this time of year as they were found up to a mile from any source of water.

The spring release on the Bison Range at Moiese was followed quite closely. On May 5, a group of boys from the Missoula High School Wildlife Club helped make a systematic search of the area to locate pairs and nests. Several scattered pairs were located and three chukar nests were found. To date, five chukar nests have been found in this area but all have been destroyed by predators.

The chukar release site at Perma was visited. The birds were flushed as widely scattered single birds and it is believed that the females were incubating and so were not located. There is a fair-sized breeding population in this area.

The only brood information obtained this quarter was from the spring released birds at Davis Creek. A hatched-out nest was discovered here on the ninth of June. The shells were scattered and an accurate count of the number of birds hatched was impossible. This brood has not been seen.

The breeders from Moiese Game Farm (49 males and 56 females) were released in McDonald Basin on June 8. They paired immediately and could be found in the vicinity of the release site for about five days. After they had been at liberty for ten days, they were scattered to a known one-half mile radius and were apparently establishing territories. These hens laid an average of twenty-seven eggs while on the game farm, but it is hoped that some reproduction may yet be realized in the wild.

Submitted by:

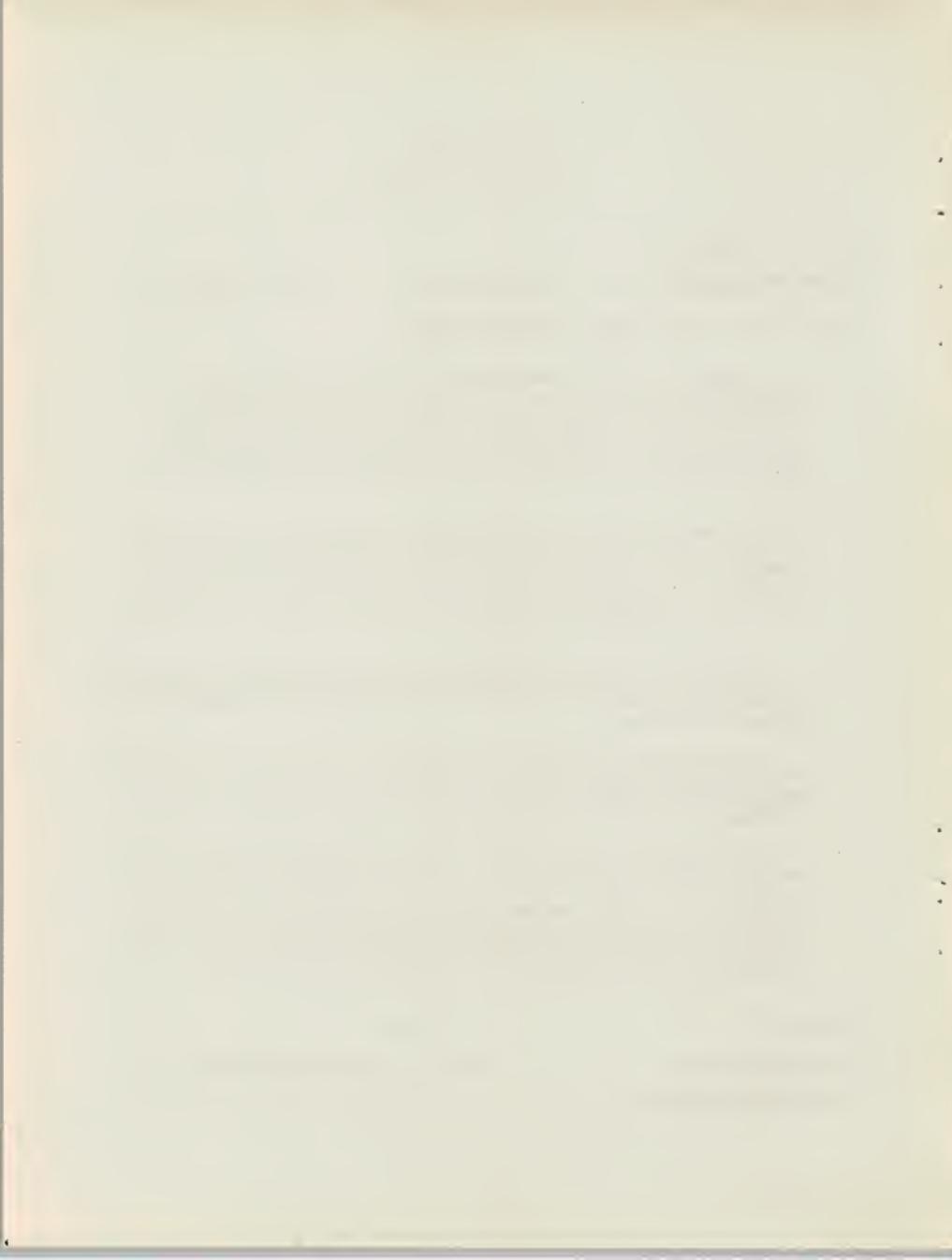
Name Wes Woodgerd

Title Junior Biologist

Approved by:

Name William R. Bergeson

Date July 15, 1953



PROGRESS REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-38-R-4

Work Plan VI

Job No. VI-B-2

Title of Job: Experimental Management Studies

Mountain Grouse Population Trends
in the Bitterroot Area in 1951, 1952, and 1953

Considering manpower limitations it was thought advisable to restrict intensive observations on the mountain grouse species to the Bitterroot River drainage—an area where all species are present and which, by nature of its geography, lends to checking hunter harvest better than most areas. Accordingly, approximately two hundred miles of established trail routes have been covered in late July in 1951, 1952, and 1953 to determine yearly grouse population trends. The West Fork drainage has been closed to grouse hunting in 1951 and 1952 to obtain a comparison of effects of hunted versus unhunted areas on grouse.

Results of these observations are shown in Table 1.

Table 1. Grouse Observations in the Bitterroot Area*

	Date	All Grouse	Blue Grouse	Ruffed Grouse	Franklin's Grouse
East Fork (open)	1951	.24	.19	.00	.08
	1952	.54	.25	.11	.15
	1953	.33	.19	.06	.07
West Fork (closed)	1951	.26	.04	.06	.28
	1952	.52	.35	.17	.00
	1953	.49	.42	.06	.01

* Grouse per mile of route

Based on results of these censuses, it is indicated that; (1) there are fewer mountain grouse in 1953 than in 1952 but more than in 1951, (2) blue grouse have increased each year in the West Fork (closed) area but are less numerous in the East Fork area than in 1952, (3) ruffed grouse were less numerous in 1953 than in 1952 in both the open and closed areas, and (4) Franklin's grouse are less numerous in 1953 on the East Fork (open) area than in 1951 and 1952, and they have been much less

numerous in 1952 and 1953 than in 1951 on the West Fork (closed) area.

The seventeen blue grouse broods observed in 1953 averaged 3.6 young which is larger than the ten-year average blue grouse brood size of 3.3 young based on 128 broods. Only four broods of ruffed grouse which averaged 2.5 young were observed in 1953 compared to an average of 3.5 young ruffed per brood observed in past years. Only two broods of three young Franklin's grouse were observed in 1953 compared to an average Franklin's grouse brood size of 3.3 young in past years. Thus, production of blue grouse is indicated to be above average and production of ruffed and Franklin's grouse below average in 1953.

Submitted by Fred Hartkorn Approved by Wm. R. Bergeson

Date July 15, 1953

STATE Montana
PROJECT NO. W-39-R-4
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT FOR
SURVEYS AND INVESTIGATIONS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Waterfowl Surveys and Investigations

2. Personnel: Wynn G. Freeman, Biologist, Leader
Gerald J. Salinas, Biologist
LeRoy J. Ellig, Junior Biologist

3. Report of Progress:

Work Plan I: State-wide Census

Job I-A: Aerial Waterfowl Census
Proceeding. This data will be reported in the 1953
Breeding Ground Report.

Job I-B: Ground Waterfowl Census
Proceeding. This data will be reported in the 1953
Breeding Ground Report.

Job I-C: Study of Census Methods and Biology of Waterfowl in
Flathead Valley
Ground trend census rerun in the lower valley. Intensive
waterfowl census and habitat evaluation in the upper valley
proceeding. Progress report will be submitted in the next
quarterly.

Job I-D: Initiate a Comprehensive Study on Winter Populations
of Waterfowl
Inactive during report period.

Work Plan II: Waterfowl Production Studies

Job I-E: Study of Relationship of Stock Water Reservoirs to
Waterfowl Production
Inactive.

Work Plan III: Evaluation of Hunter Harvest

Job I-F: Study of Hunter Harvest of Waterfowl
Inactive during report period.

Work Plan IV: Waterfowl Banding

Job I-G: Waterfowl Movements and Migration Study
Summer banding of flightless geese and ducks proceeding.
This year project personnel have participated in goose
banding on Flathead Lake, Pablo Refuge and Bowdoin Refuge.

Work Plan V: Pre-Acquisition Studies of Development Area

Job I-H: Pre-Acquisition of Freezout Lake
This study has been proceeding. LeRoy Ellig has been
assigned to continue this work.

Job I-I: Pablo Refuge Management Investigation
Inactive during report period.

Job I-J: Blackfoot-Clearwater Habitat Development Investigations
on State Lands
Inactive during report period.

Job I-K: Sun River Waterfowl Habitat Investigations on State
Lands
Inactive during report period.

Job I-L: Investigation of Potential Waterfowl Habitat for
Development
Plans are proceeding for preliminary development work
at Brown's Lake.

Progress was made on the Milk River development. Field
work lead to completion and submission of the project
development documents. Dale Witt has been assigned as
project leader.

Waterfowl habitat survey in the Bitterroot Valley is
proceeding on schedule.

Submitted by:

Name Gerald J. Salinas

Title Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

STATE Montana
PROJECT NO. W-49-R-2
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT FOR

INVESTIGATIONS PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Fur Resources Surveys and Investigations
2. Leader: Fletcher E. Newby, Junior Biologist
3. Report of Progress:

Work Plan I: Determination of the Economic Importance of the Montana Fur Resource

Job I-A: Annual Yield and Income from the Fur Resource as Determined by Examination of Dealer Records

Completion report for 1951-52 season attached. Proceeding for the 1952-53 season.

Job I-B: The Annual Fur Harvest as Determined from Analysis of Trapper Report Cards

Proceeding for 1952-53 season. Six hundred seventy-three reports or 53 per cent of the total were received from trappers. Preliminary analysis has been accomplished by use of IBM Electric Accounting Machine Cards.

Work Plan II: Survey of Fur Animal Distribution, Habitat and Population Status

Job II-A: Extensive Survey of Fur Animal Distribution, Habitat and Population Status

Proceeding.

Job II-B: Muskrat Population Trends

Inactive during report period.

Job II-C: Survey of Beaver Distribution and Status in the Jefferson Basin

Proceeding. A management plan for the beaver of Montana for 1953-54 was formulated. Methods used in analyzing the land owner beaver permit system in the Jefferson basin (Wildlife Restoration Quarterly Report, October-December, 1952) were elaborated and then applied to fifteen representative counties. A state-wide beaver harvest was thus recommended and a Trapper Map showing forty-nine beaver trapping areas with the respective numbers of beaver to be taken was devised.

Beaver population status data were collected with the help of H. Demaree and O. Lewis (deputy game wardens). Approximately one thousand beaver pelts were measured and examined to provide data for statistical analysis with a view toward possible aging methods.

Job II-D: Population Status and Movements of Marten

Proceeding.

Job II-E: The Effect of Otter Food Habits on Fish and Fur Animal Populations

Completion report on the Thompson Lakes segment has been prepared. The manuscript has been submitted to the Journal of Mammalogy for publication.

ABSTRACT: A food habits study by scat analysis was conducted from April, 1952 through May, 1953, in the Thompson Lakes region of Lincoln County, Montana, to help evaluate the economic status of the river otter (Lutra canadensis). Ninety-six otter latrines supplied 1,374 scats with a known date of deposit. Material was gathered from two separate areas and analyzed data were compared. Limited sampling was conducted to obtain a suggestion of fish abundance and "sign" was used to estimate fur bearer numbers to help evaluate food habits. For the entire year and for both areas fish remains were identified most frequently, appearing in 1,280 (93.2%) of the 1,374 scats. Invertebrates were recorded for 566 (41.2%), amphibians 253 (18.4%), mammals 212 (15.4%), birds 71 (5.2%) and reptiles 5 (0.4%). Each of these groups retained the same position in relative importance throughout all seasons except fall when mammals replaced amphibians for third. The data suggest availability of prey to be important in determining the food habits of otter.

Job II-F: Distribution and Status of the Wolverine

Completion report submitted in Wildlife Restoration
Quarterly Report for October-December, 1952.

Submitted by:

Name Fletcher E. Newby

Title Junior Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. W-49-R-2

Work Plan No. I

Job No. I-A

Title of Job: Annual Yield and Income from the Fur Resource as Determined by Examination of Fur Dealer Records - 1951-52 Season

OBJECTIVES:

Determination of annual yield and value of the fur crop as basic information in the management of the fur resource.

TECHNIQUES USED:

Most of the fur dealers and fur dealers' agents in the State were contacted in personal interviews. Section 26-1302 of Chapter 13, Fish and Game Laws of Montana, 1951-52, states:

"Section 26-1302. Records to Be Kept by Fur Dealers-Inspection. Every fur dealer shall keep a book in which shall be recorded separately on the date of each transaction, the following facts:

- (a) The number and kind of all skins or pelts purchased or sold by such fur dealer.
- (b) The place where such skins or furs were killed or trapped and a separate record of all skins or pelts as were killed or trapped outside the State of Montana.
- (c) The trapping license number under which such furs or pelts were taken in cases where a trapper's license is required for the taking thereof.
- (d) The name and addresses of the persons to whom such skins or pelts were sold or from whom they were purchased.

Said book shall be open at all reasonable times to the inspection of the State Fish and Game Warden or any of his deputies, or any United States Game Warden, and shall be preserved and accessible for one year after the expiration of any license granted to said fur dealer."

Additional data on the transactions of certain small dealers were obtained from the records of larger fur houses who purchased furs from them. Records of other dealer sales and most out-of-state sales were found in the shipping permit records of the Fish and Game Department. These permits bear the name of the consignee and

consignor, destination and number and kind of—fur-bearing animals, or the skins from fur-bearing animals or parts thereof—to be shipped out of the State and should furnish a complete record of out-of-state shipments. Fur dealers in Idaho Falls and Rexburg, Idaho, were interviewed regarding purchases of furs taken in Montana.

Data obtained from the above sources were recorded on prepared forms. The first provision of part (b) of Section 26-1302 was in no case complied with; thus there was no more accurate criterion for locality of capture than the trapper's address. Using this as a basis for county designation, the data were recorded by counties. It was recognized that this method would frequently fail to place the locality of capture in the correct county. In an effort to make comparison of fur production in different areas and to minimize the errors present at the county level, the State was divided into eight districts of several counties each. (Figure 1) This division is at present chiefly arbitrary but an effort was made to group counties with similar characteristics. Continued study will result in the selection of more accurate boundaries relative to natural and economic factors.

Data for the calculation of average prices were secured from dealer's records. In general, excellent cooperation was received.

FINDINGS:

Tabular summaries of the data on yield, value, average pelt price and out-of-state sales appear in Tables I, II, III and IV. Data in Tables I and IV are compared with information from 1951-52 Trapper's Reports (Wildlife Restoration Quarterly Report, July-September, 1952) for purposes of evaluation.

Table V presents the average income to the individual from Trapper Reports and fur dealer records. Income from beaver trapping for both types was based on fur dealer records since this information was not available from Trapper Reports.

Information on the beaver take is available from two sources—the tagging records of the Fish and Game Department and the records of fur dealers. Tagging records include all beaver taken on permits issued to land owners and all beaver taken on Indian Reservations except the Flathead Indian Reservation. Tags were issued by the Fish and Game Department for 9,827 beaver. Fur dealer records showed transactions involving 8,583 beaver. This discrepancy may be due to several causes. Many beaver are received by tanners and furriers for the manufacture of coats for private individuals. The number of beaver involved in this situation is difficult to determine. Inspection of shipping permit records disclosed at least 1,067 beaver sent to fur dressers by furriers and private individuals for tanning and dressing. In addition, records of the purchases of some smaller dealers are incomplete.

MONTANA.

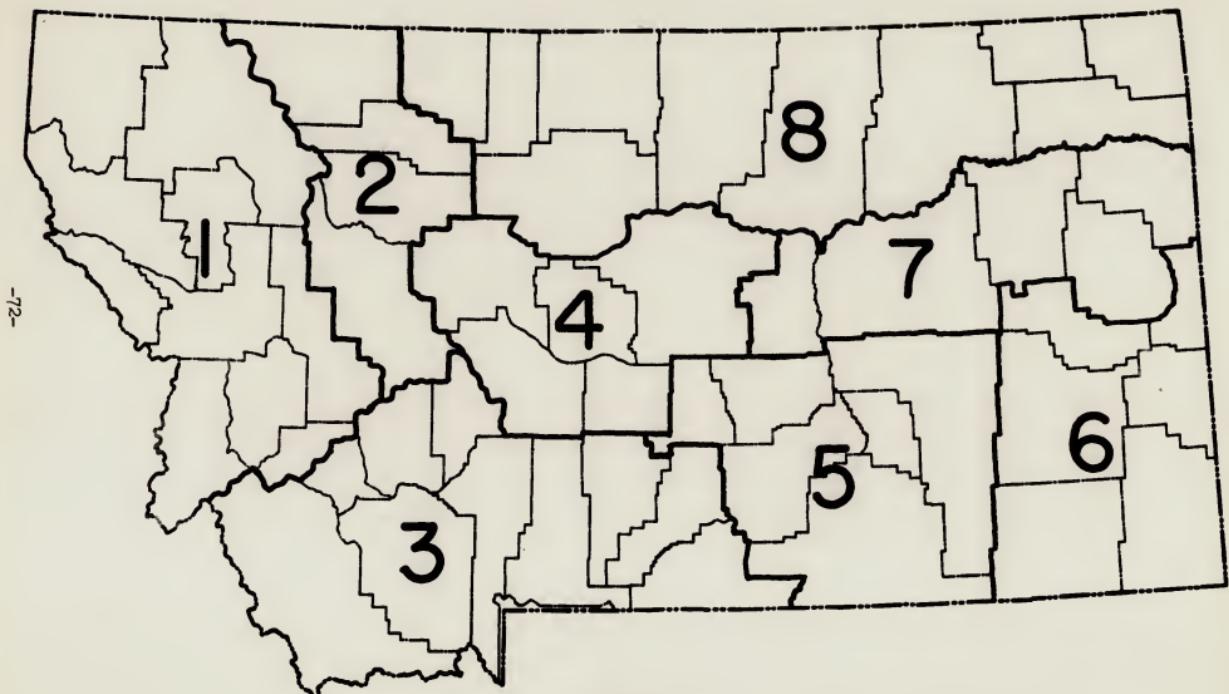


FIGURE I
FUR DISTRICTS

Three sources provide information on the marten take. Trapper Report cards with 56.4 per cent of the trappers reporting, indicate a calculated total take of 1,005 marten. Incomplete tagging records of the Fish and Game Department show a minimum take of 884 marten. Fur dealer records show transactions involving 751 marten. Shipping permit records show 101 marten shipped to tanners and dressers by furriers and private individuals.

ANALYSIS AND RECOMMENDATIONS:

The above techniques should provide a nearly complete picture of transactions in the fur industry of Montana. In actual practice several sources of error are present. One of the more important sources is the practice of transporting furs to business centers a short distance outside the State. It was determined previously (*Wildlife Restoration Quarterly Report, July-September, 1952*) that dealers in Rexburg and Idaho Falls, Idaho, bought quantities of furs taken in Beaverhead and Madison Counties. Additional data on this situation were obtained. It is also known that a similar situation exists with respect to Minot and Williston, North Dakota, and it is planned that information on these outlets will be obtained in succeeding years. It is likely that such outlets account for a considerable portion of the fur take which is not represented in the findings presented here.

Considering the current low prices for most pelts and the ease with which more gainful employment is found, the illegal take is not thought to be highly significant.

In view of the fact that information regarding the beaver and marten take derived from fur dealer records falls short of the known minimum, it is likely that the case is the same for other species. Fur take data provided by the examination of fur dealer records in most cases represent actual transactions rather than calculated figures. Errors, if their magnitude were known, would in general add to the total as indicated by the data on marten and beaver take from multiple sources. It is therefore suggested that these findings be considered conservative.

Inaccurate or incomplete dealer records are another source of error.

Comparison of the data from trapper reports and fur dealer records indicate general agreement regarding distribution of take by districts and composition of take by species (Table I and IV), particularly for mink, muskrat and marten. Many fur dealers tend to be lax in recording transactions involving predators and thus there is considerable difference in numbers of predators reported.

An important source of disagreement between the two types of data in Districts 2 and 5 is the fact that trappers residing in Helena and Billings frequently trap in other districts. Trappers personally

TABLE I. YIELD OF 1951-1952 TRAPPING SEASON, DISTRICT AND STATE-WIDE
COMPARISON OF TRAPPER REPORT AND FUR DEALER RECORD DATA

	1		2		3		4		5	
	TR	FD	TR	FD	TR	FD	TR	FD	TR	FD
Mink	1,541	1,459	322	600	1,936	1,706	1,069	894	231	671
Muskrat	20,433	17,099	2,776	3,398	12,172	12,143	5,204	3,734	3,505	6,106
Marten	745	522	4	2	256	227	---	---	---	---
Weasel	1,157	538	110	98	728	338	184	111	39	63
Bobcat	247	65	58	31	251	112	37	25	205	121
Skunk	86	3	39	72	537	102	270	21	108	26
Raccoon	---	---	---	---	73	6	2	---	211	59
Coyote	111	5	5	1	33	2	7	4	4	---
Fox	8	3	4	1	4	---	---	3	---	---
Badger	31	5	---	1	47	3	11	2	30	5
Lynx	8	5	---	---	9	---	---	---	---	---
Wolverine	3	---	---	---	---	---	---	---	---	---
TOTALS*	24,370	19,704	3,318	4,204	16,046	14,639	6,784	4,794	4,333	7,051
% of total	39.7	35.1	5.4	7.5	26.2	26.1	11.1	8.6	7.1	12.6
Beaver	**	1,977	---	1,071	---	2,258	---	946	---	715

* State-wide total, including beaver, on next page

** This information not solicited

TABLE I. (Continued)

	6		7		8		MONTANA TR		MONTANA FD		Ave. Price
	TR	FD	TR	FD	TR	FD	No.	Value	No.	Value	
Mink	6	12	153	33	661	685	5,919	\$ 91,270.98	6,060	\$ 93,384.60	15.42
Muskrat	4	17	1,450	680	3,738	4,106	49,282	49,282.00	47,283	47,283.00	1.00
Marten	--	--	--	--	--	--	1,005	15,567.45	751	11,632.99	15.49
Weasel	4	--	16	8	101	74	2,339	2,081.71	1,230	1,094.70	.89
Bobcat	15	2	4	5	18	2	835	1,436.20	363	624.36	1.72
Skunk	43	--	29	21	174	3	1,286	938.78	248	181.04	.73
Raccoon	15	1	4	6	--	--	305	305.00	72	72.00	1.00
Coyote	--	--	--	2	8	--	168	189.84	14	15.82	1.13
Fox	--	--	--	--	--	--	16	20.00	5	7.50	1.25
Badger	30	1	--	5	59	3	182	149.24	27	23.76	.82
Lynx	--	--	--	--	--	--	17	85.00	5	25.00	5.00
Wolverine	--	--	--	--	--	--	3	60.00	---	---	20.00
TOTALS	91	33	1,656	760	4,759	4,873	61,357	\$161,386.20	56,058	\$154,344.77	
% of total	.02	.01	2.7	1.4	7.8	8.7	100.0		100.00		
Beaver	---	---	--	225	---	1,146	9,827*	\$ 98,368.27	8,583	\$ 85,915.83	10.01
State-wide Total							71,184	\$259,754.47	64,641	\$240,260.60	

* From tagging records

TABLE II
AVERAGE PELT PRICES - DISTRICT AND STATE-WIDE
1951-52 SEASON

	1	2	3	4	5	6	7	8	MONTANA
Beaver	10.39	12.19	10.06	8.93	9.42	5.94	9.31	8.98	10.01
Mink	15.31	14.59	15.54	15.73	14.80	**	**	15.82	15.41
Muskrat	1.00	.98	1.04	.97	1.03	**	**	.88	1.00
Marten	15.67	**	15.16	**	*	*	*	*	15.49 ..

* - None were caught in the district.

** - State-wide average used; district sample insufficient to obtain accurate average.

TABLE III
OUT-OF-STATE SALES

	Total take	Out-of-state sales	Percent of total
Mink	6,060	861	14.2
Muskrat	47,283	3,492	7.4
Marten	751	209	27.8
Beaver	8,583	956	11.1
Weasel	1,230	194	15.8
Bobcat	363	62	17.1
Skunk	248	6	2.4
Raccoon	72	27	37.5
Coyote	14	—	0.0
Fox	5	2	40.0
Badger	27	4	14.8
Lynx	5	3	60.0
Wolverine	3	—	0.0
Total	64,644	5,816	9.0

TABLE IV
COMPOSITION OF FUR TAKE
1951-52 SEASON
COMPARISON OF TRAPPER REPORT AND FUR DEALER RECORD DATA

	NO.		% OF TOTAL PELTS		VALUE		% TOTAL VALUE	
	TR	FD	TR	FD	TR	FD	TR	FD
Beaver	9,827*	8,583	13.8	13.3	98,368.27	85,915.83	37.9	35.8
Mink	5,919	6,060	8.3	9.4	91,270.98	93,384.60	35.1	38.9
Muskrat	49,282	47,283	69.2	73.1	49,282.00	47,283.00	19.0	19.7
Marten	1,005**	751	1.4	1.2	15,567.45	11,632.99	6.0	4.8
Sub-Total	66,033	62,677	92.7	97.0	254,488.70	238,216.42	98.0	99.1
All Others	5,151	1,964	7.3	3.0	5,265.77	2,044.18	2.0	0.9
Total	71,184	64,641	100.0	100.0	259,754.47	240,260.60	100.0	100.0

* -- From tagging records.

** -- Incomplete tagging records show a minimum of 884 marten.

TABLE V
AVERAGE INCOME TO INDIVIDUAL TRAPPER
1951-52 SEASON - DISTRICT & STATE-WIDE
COMPARISON OF TRAPPER REPORT AND FUR DEALER DATA

	1	2	3	4	5	6	7	8	MONTANA
No. Trappers	417	84	397	186	67	26	33	140	1,350
Ave. Ind. Income FD	\$150	256	149	128	318	47	82	155	159
Ave. Ind. Income TR	\$172	201	162	152	186	46	161	152	170

indicate the county in which they trap on the Trapper Report, while their addresses are the basis for county and district designation in fur dealer record examinations.

Although the data contained here are insufficient for the formation of definite conclusions regarding the reliability of each type of data, it appears probable that the Trapper Report provides the most accurate information concerning distribution, magnitude and composition of take.

It is recommended that collection of information by both methods be continued for at least one additional season.

SUMMARY:

The 1951-52 take of furs totaled approximately sixty-five thousand pelts worth one-quarter million dollars. Four species—beaver, mink, muskrat and marten—produced 97 per cent of the pelts and 99 per cent of the income. Beaver and mink share the top position as fur-producing species.

Considering distribution of take on a geographical basis, the western and southwestern districts, one and three, produced more than sixty per cent of the pelts while occupying approximately forty per cent of the area of the State.

Nine per cent of the pelts taken were sold to out-of-state buyers, usually in Chicago, New York, Seattle or St. Louis. Fourteen per cent of the mink and 28 per cent of the marten were sold outside the State.

Comparison of data obtained from Trapper Reports and from fur dealers records examinations is made. Indications are that the Trapper Report may provide the most accurate information but additional evidence is needed.

The average income to the individual trapper was \$159.00 as based on analysis of fur dealer records and \$170.00 from Trapper Reports.

DATA AND REPORTS:

The original data are with the project leader at Kalispell, Montana.

Prepared by Fletcher E. Newby Approved by Robert F. Cooney
Date July 15, 1953

STATE Montana
PROJECT NO. W-5-D-11
DATE July 15, 1953
VOL. IV NO. 2

FINAL REPORT FOR
DEVELOPMENT PROJECTS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: General Wildlife Restocking
2. Leader: James McLucas, Fieldman
3. Report of Progress:

MOUNTAIN GOAT TRAPPING AND TRANSPLANTING

DATES: July 1, 1952 to June 30, 1953

PERSONNEL: James McLucas, Project Leader
Wayne Fitzwater, Deputy Game Warden
Earl Andridge, Junior Fieldman

AREAS: Deep Creek, Chouteau County
South Fork of the Flathead, Flathead County
Canyon Creek, Beaverhead County

PURPOSE:

The trapping and transplanting of mountain goats with the purpose of establishing new groups in areas within the State suitable to this valuable big game animal.

This trapping and transplanting of mountain goat has been felt to be one of the most important phases of our big game restoration work. Originally goats were found on a limited range along the Continental Divide and on several mountain ranges to the west. Large

mountainous areas lying to the east of the Continental Divide were completely devoid of this big game species.

The transplanting work has of necessity been slow due to extreme difficulties involved in capturing and moving mountain goats. The results, however, have been pleasing. Herds are now developing in several areas from rather small original introductions.

PROCEDURE:

DEEP CREEK TRAPPING SITE

About ten days were spent in this area from May 20, 1953 to May 31, 1953. The greatest part of this time was spent on trap maintenance on the Deep Creek trap and the Wagner Basin trap. Several days were spent in trapping operation but this work was stopped by a heavy May snowfall.

No goats were taken from this area during the year.

CANYON CREEK TRAPPING SITE

August 13, 1952 through August 19, 1952, was spent in this area building a goat holding pen and in minor repair to the trap. During this time two goats were caught and transported to the East Rosebud Canyon.

SOUTH FORK OF THE FLATHEAD TRAPPING SITE

The South Fork goat trapping operation was carried out the same as in previous years. Operation was started on June 14, 1953, when horses, equipment, etc., were gathered together. On June 23, the horses were trucked to Spotted Bear and two days later camp was set up in the Little Salmon park. On June 28 four goats were caught and flown to the East Rosebud Canyon release site. There was no loss in trapping during this period.

Goat trapping was continued here during July and will be reported on in the July-September quarterly.

GOAT TRANSPLANTING DATA

The following is the transplanting data for the two goats taken on Canyon Creek and the four goats taken on the South Fork of the Flathead:

GOAT TRANSPLANTING DATA, 1953

Ear Tag Numbers	Date	Age & Sex	Trap Site	Release Area
314-315	6-28	Mature Billy	South Fork	*East Rosebud Canyon
312-313	6-28	Mature Nanny	South Fork	East Rosebud Canyon
310-311	6-28	Billy Kid	South Fork	East Rosebud Canyon
306-307	6-28	Mature Billy	South Fork	East Rosebud Canyon
F-410	8-22	Billy Kid	Canyon Creek	East Rosebud Canyon
F-402	8-22	Mature Nanny	Canyon Creek	East Rosebud Canyon

*East Rosebud Canyon - Beartooth Plateau, Custer National Forest

PREDATOR CONTROL

The period of December 15, 1952 to March 31, 1953, was spent on predator control in the Sun River sheep range as reported in the January-March, 1953, Wildlife Restoration Division Quarterly.

Submitted by:

Name James McLucas

Title Fieldman

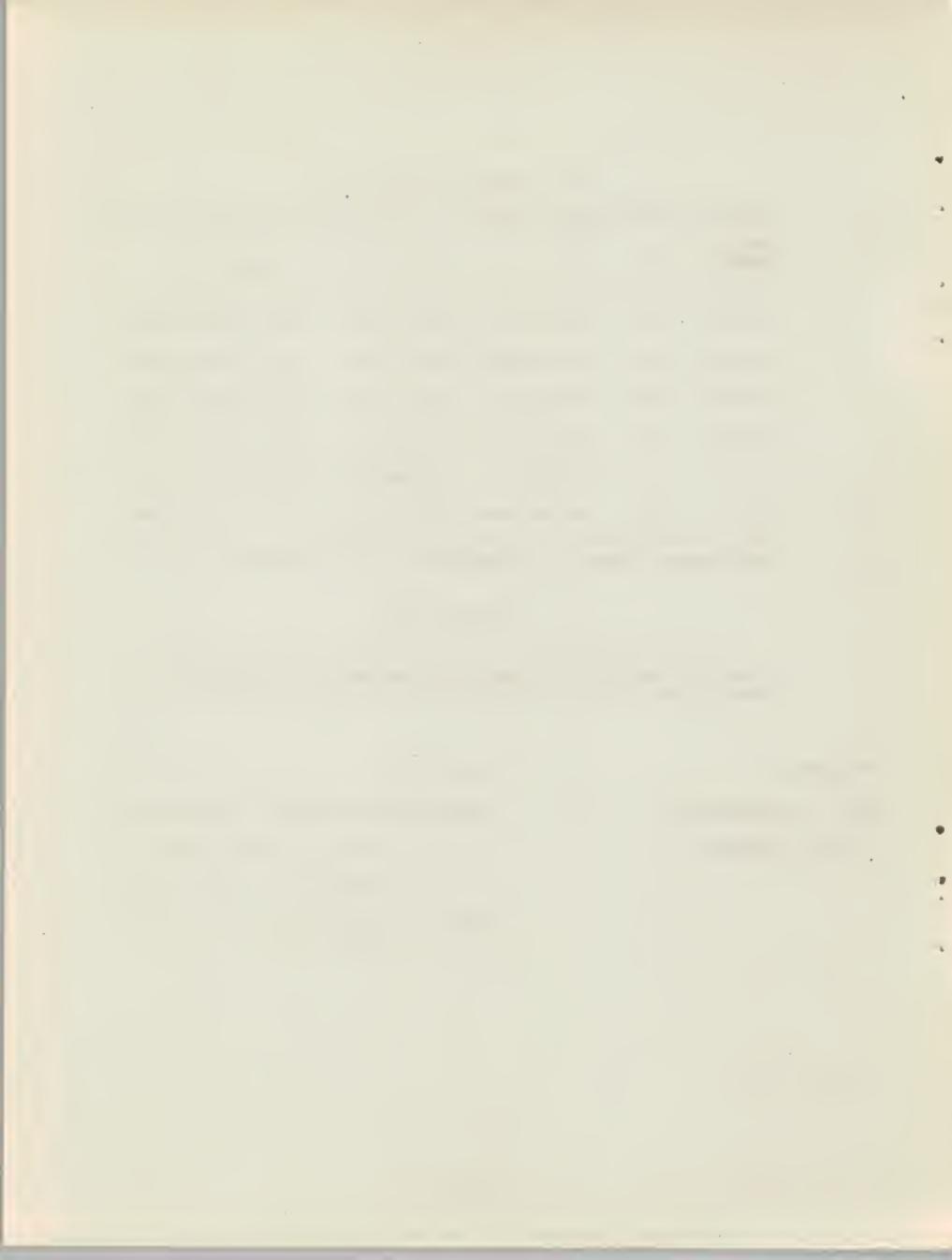
Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



STATE Montana
PROJECT NO. W-27-D-6
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT FOR

DEVELOPMENT PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Sun River Winter Elk Range Development
2. Personnel: Bruce Neal, Unit Manager
Robert Neal, Assistant Unit Manager
Dave Stonehouse, Laborer
3. Report of Progress:

FENCE CONSTRUCTION:

1. A drift fence was constructed between Hannan Gulch and Wagner Basin. This fence was constructed to act as a barrier to elk that migrate to lands not owned by the Fish and Game Department.

This fence is made with seven-foot poles in the form of jacks, has seven wires and a cable on the top and is approximately one-fourth mile long.

2. One and one-quarter miles of fence was constructed bordering the W. M. Stecker property. It is a six-foot jack fence with five wires and a pole on top and an anchor every tenth crotch.

The Stecker exchange was reported in a letter amendment to Project W-25-L.

Submitted by:

Name Robert Neal

Title Assistant Unit Manager

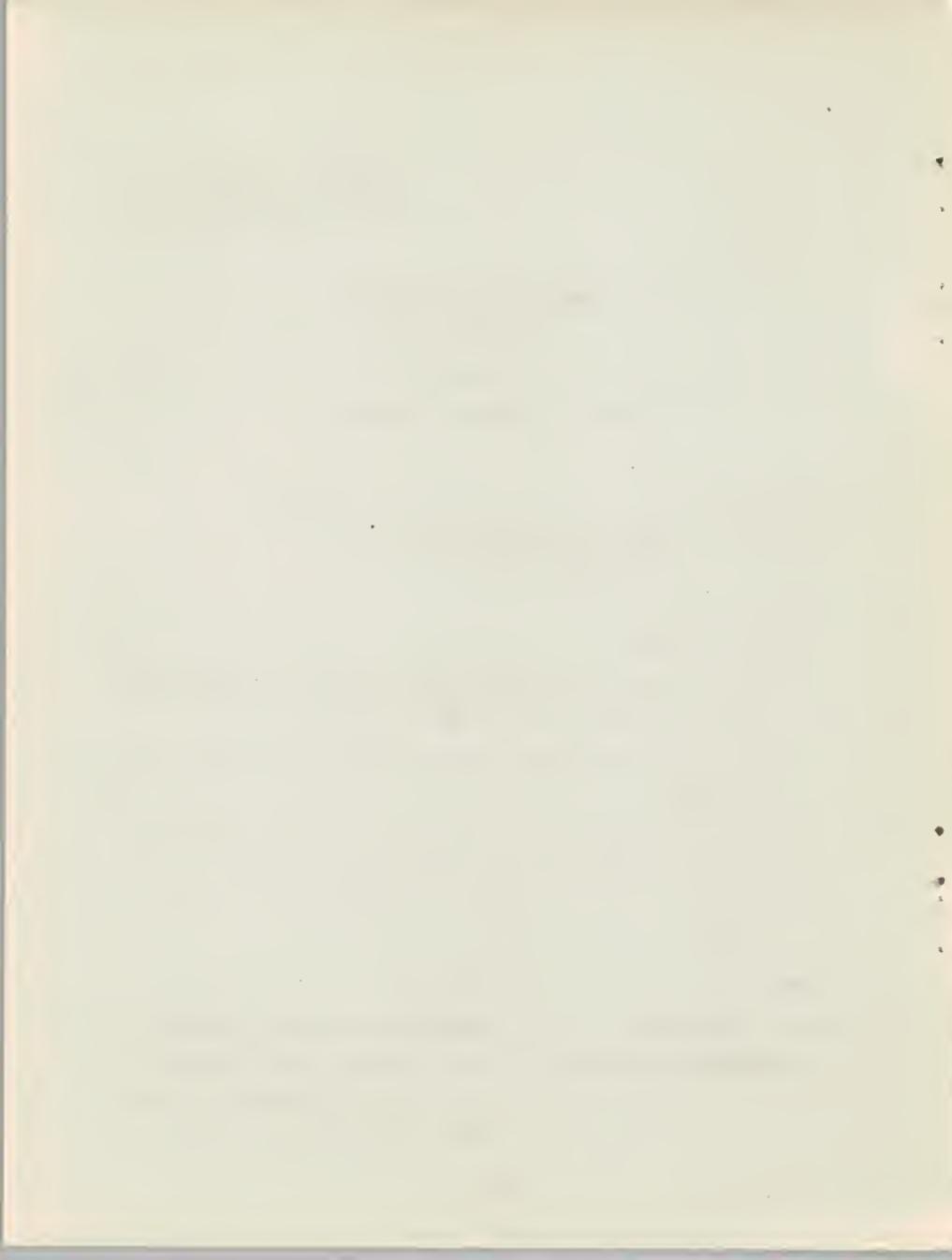
Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



STATE	Montana
PROJECT NO.	W-33-D-4
DATE	July 15, 1953
VOL.	IV
NO.	2

QUARTERLY PROGRESS REPORT FOR
 DEVELOPMENT PROJECTS
 As Required By
 FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Blackfoot-Clearwater Winter Big Game Range Development
2. Personnel: Stan Mongrain, Project Leader
 Jack Ray, Junior Fieldman
3. Report of Progress:

A. TRUCK GARAGE:

A standard metal building by the Armco Company was erected at the headquarters for use in storing automotive equipment.

B. FENCE CONSTRUCTION:

Three and three-quarter miles of fence were constructed on the eastern boundary of the project. This was located in Sections 16, 21 and 28, Township 15 North, Range 13 West. It was necessary to carry the balance of the proposed fence construction into the next fiscal year.

C. SHOP:

One month's time for three men in the shop was charged to the project to cover costs of mechanical repairs and machinery maintenance for this project.

D. CULVERTS:

Steel culverts proposed for this project were placed in necessary places to supplant bridge construction.

E. EQUIPMENT:

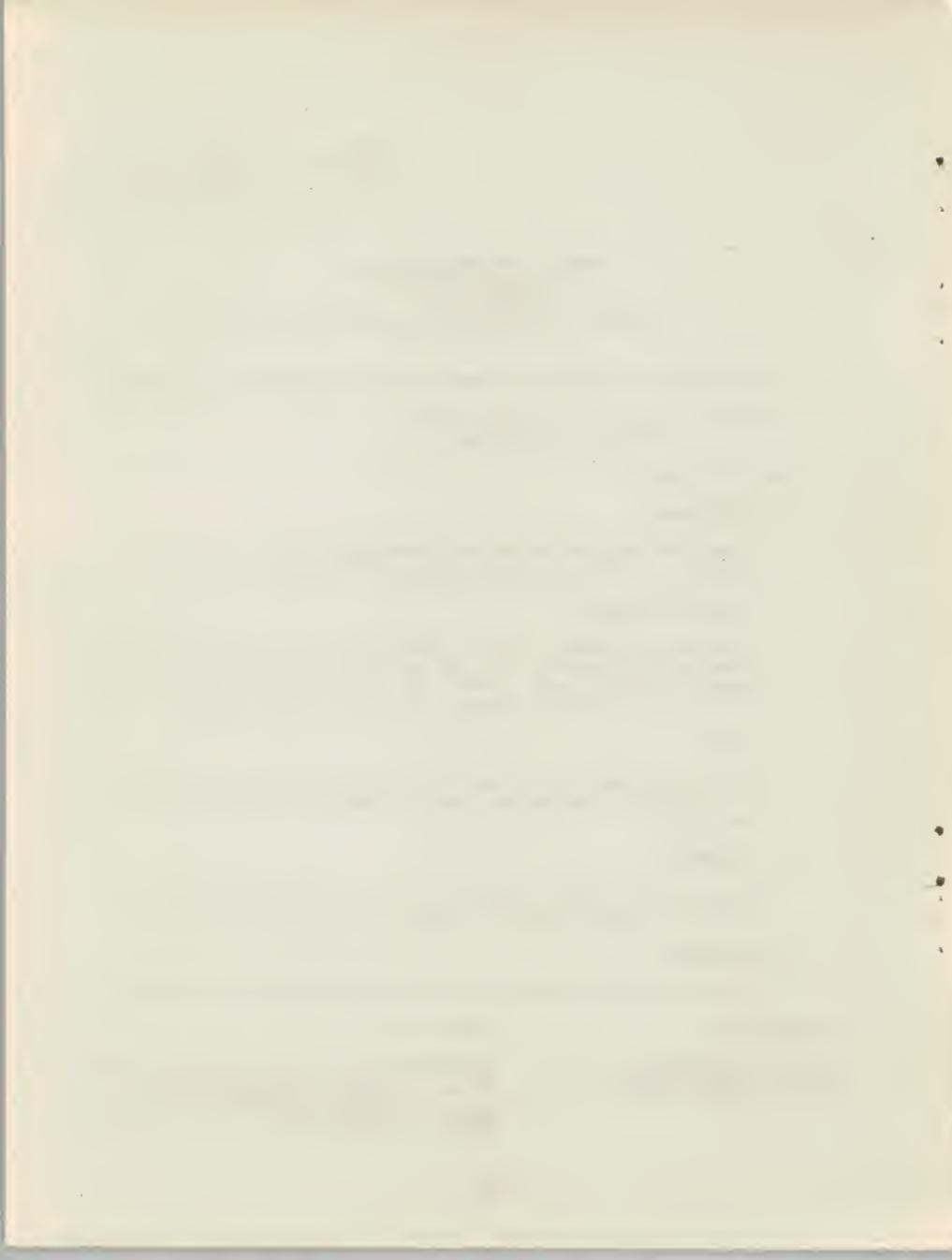
A Ford tractor with hydraulic loader was purchased for this project.

Submitted by:

Name Stan Mongrain
 Title Project Leader

Approved by:

Montana State Department of Fish and Game
 By Robert F. Cooney, Director
Wildlife Restoration Division
 Date July 15, 1953



STATE Montana
PROJECT NO. W-33-D-4
DATE July 15, 1953
VOL. IV NO. 2

FINAL REPORT FOR
DEVELOPMENT PROJECTS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title: Blackfoot-Clearwater Winter Big Game Range Development
2. Personnel: Stan Mongrain, Project Leader
Jack Ray, Junior Fieldman
3. Report of Progress:

A. TRUCK GARAGE:

A metal Steelox building by Armco Company was erected on a concrete foundation at the headquarters site for the purpose of housing vehicles.

B. FENCE CONSTRUCTION:

Boundary fence amounting to four and three-quarter miles was constructed along the eastern side of the project in Sections 16, 21 and 28 of Township 15 North, Range 13 West. The balance of the proposed fence construction will be carried over into the next fiscal year.

C. VEHICLE AND MACHINERY REPAIR:

Three man-months of mechanic time were charged to this project for work done in the Department shop.

D. CULVERTS:

The seven culverts proposed for this segment were placed on the project to replace several small bridges.

E. EQUIPMENT:

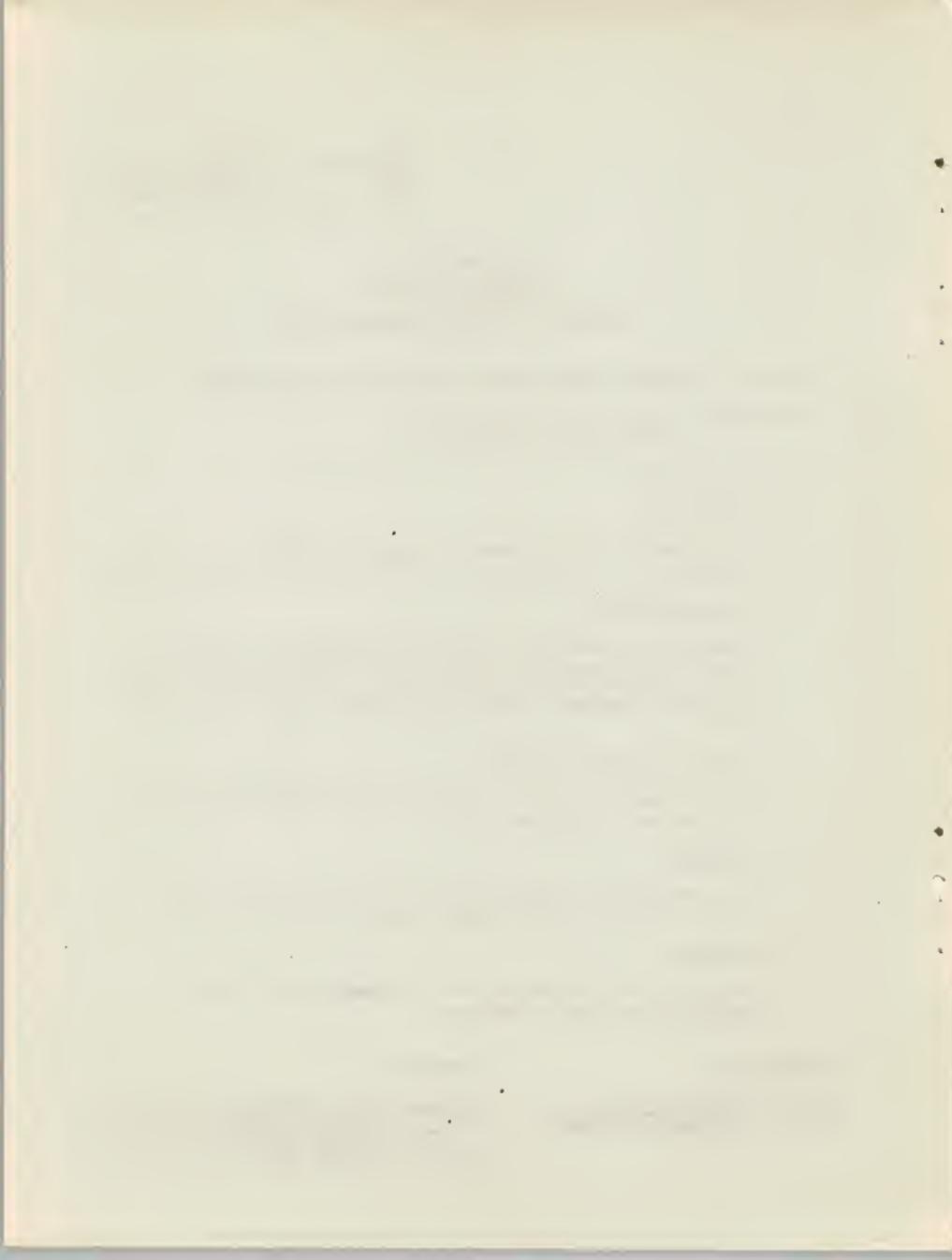
A Ford tractor with hydraulic lift attachment was purchased to facilitate operations on the ranch.

Submitted by:

Name Faye M. Couey
Title Assistant Director

Approved by:

Montana State Department of Fish and Game
By Robert F. Cooney, Director
Wildlife Restoration Division
Date July 15, 1953



STATE Montana
PROJECT NO. W-43-D-2
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT

FOR DEVELOPMENT

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Judith River Game Range Development
2. Personnel: Bert Goodman, Project Leader
Carl Aamold, Laborer
Robert Gillis, Laborer
3. Report of Progress:
 - A. Construction of a portable elk trap has been completed for use on the Judith Game Range.
 - B. Two miles of jack leg fence, three-wire with pole on top, were completed.

Right of way was cleared, anchor posts (deadmen) were set, and material was hauled and distributed for two additional miles of fence line.

Four thousand five hundred jack legs were sawed and blocked, ready for use.

Submitted by:

Name Bert Goodman

Title Project Leader

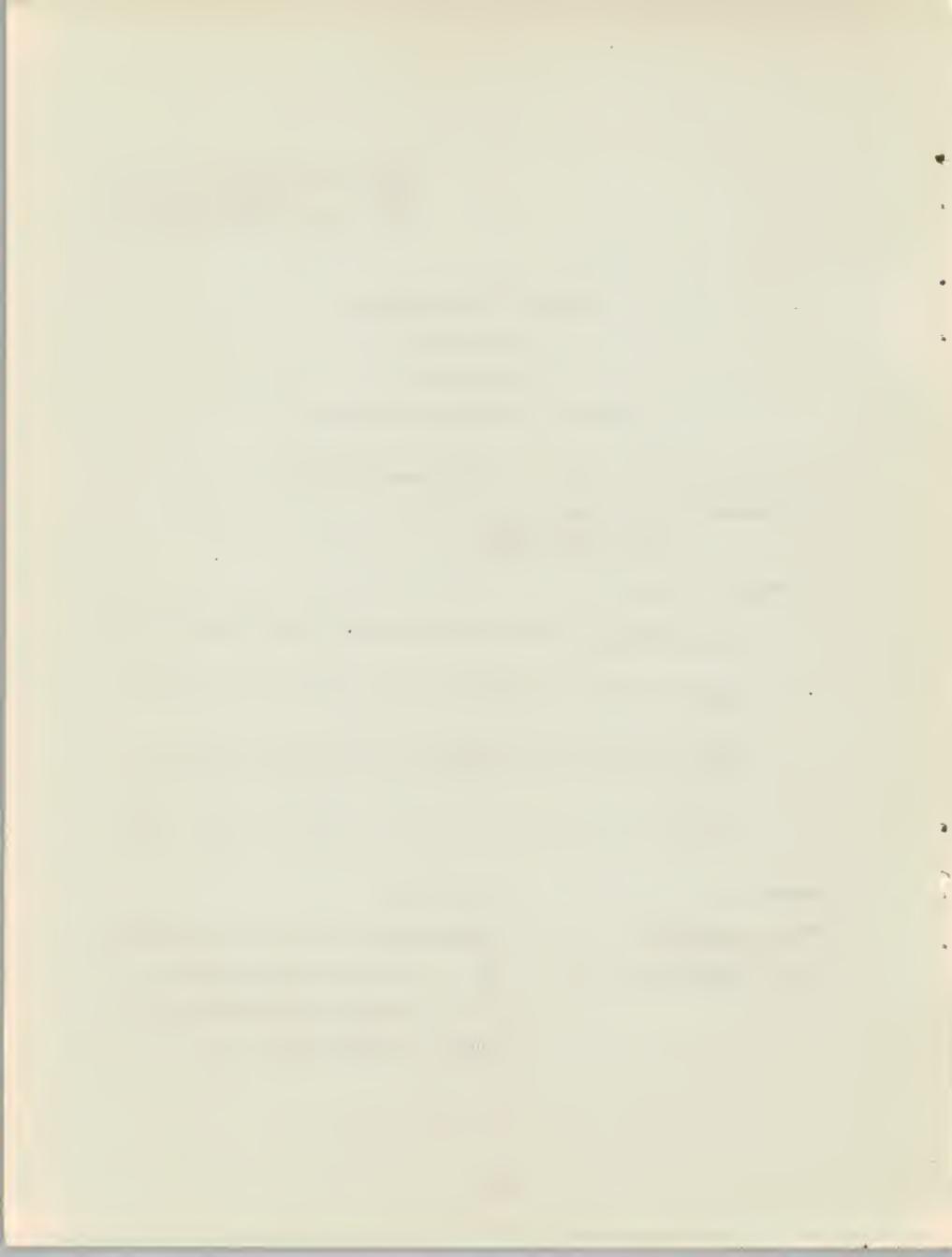
Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



STATE Montana
PROJECT NO. W-26-M-6
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT

FOR MAINTENANCE PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Game Range Maintenance Through Salt Distribution
2. Personnel: Phillip B. Marshall, Junior Biologist, Leader
Fred Hartkorn, Biologist
Wesley Woodgerd, Biologist
Jack Bailey, Fisheries Division
Marion Ammerman, Deputy Game Warden
Dwight Stockstad, Student Assistant
Students and Sportsmen from Missoula, Ovando and Superior
Warren Ellison and Ken Roth, Pilots, Johnson Flying Service
3. Report of Progress:

OBJECTIVES: To release grazing pressure on winter range by big game in late spring and early summer and to secure better distribution of big game during the summer.

PROCEDURE: Block salt was delivered to airports at Missoula, Hamilton, Plains, Augusta, and Kalispell. From these points it was distributed by air between May 11 and June 8. The routes followed were essentially the same as those set up by Rognrud (July-September Quarterly - 1950) and McDowell (April-June Quarterly - 1952). Twenty-eight trips were made in a Ford Trimotor plane carrying 3,000 pounds of salt per trip. Seventy-eight thousand pounds (39 tons) were dropped at a cost of \$3,973.50. Trips averaged one hour and thirty-five minutes each.

It is intended that this project will be followed up this summer as a step in evaluating the effectiveness of the program.

Salt was also delivered to ranger stations for ground distribution by truck and pack string.

Submitted by:

Name Phillip B. Marshall

Title Junior Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

STATE Montana
PROJECT NO. W-45-M-2
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT FOR

MAINTENANCE PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title: Maintenance of Blackfoot-Clearwater Big Game Range

2. Personnel: Stan Mongrain, Project Leader
Jack Ray, Junior Fieldman

3. Report of Progress:

A. CANALS AND DITCHES:

Considerable time was spent repairing ditches which were damaged by high water and heavy rains.

B. FENCES:

Most of the boundary fences were checked and repaired where necessary. Their condition is such that trespass stock became quite bothersome and necessitated considerable patrol.

C. ROADS:

Some road maintenance, particularly the headquarters entrance road and the elk pen road, was required.

D. MISCELLANEOUS:

An electric range was purchased to replace old existing cooking facilities in the crew quarters.

Submitted by:

Name Stan Mongrain

Title Project Leader

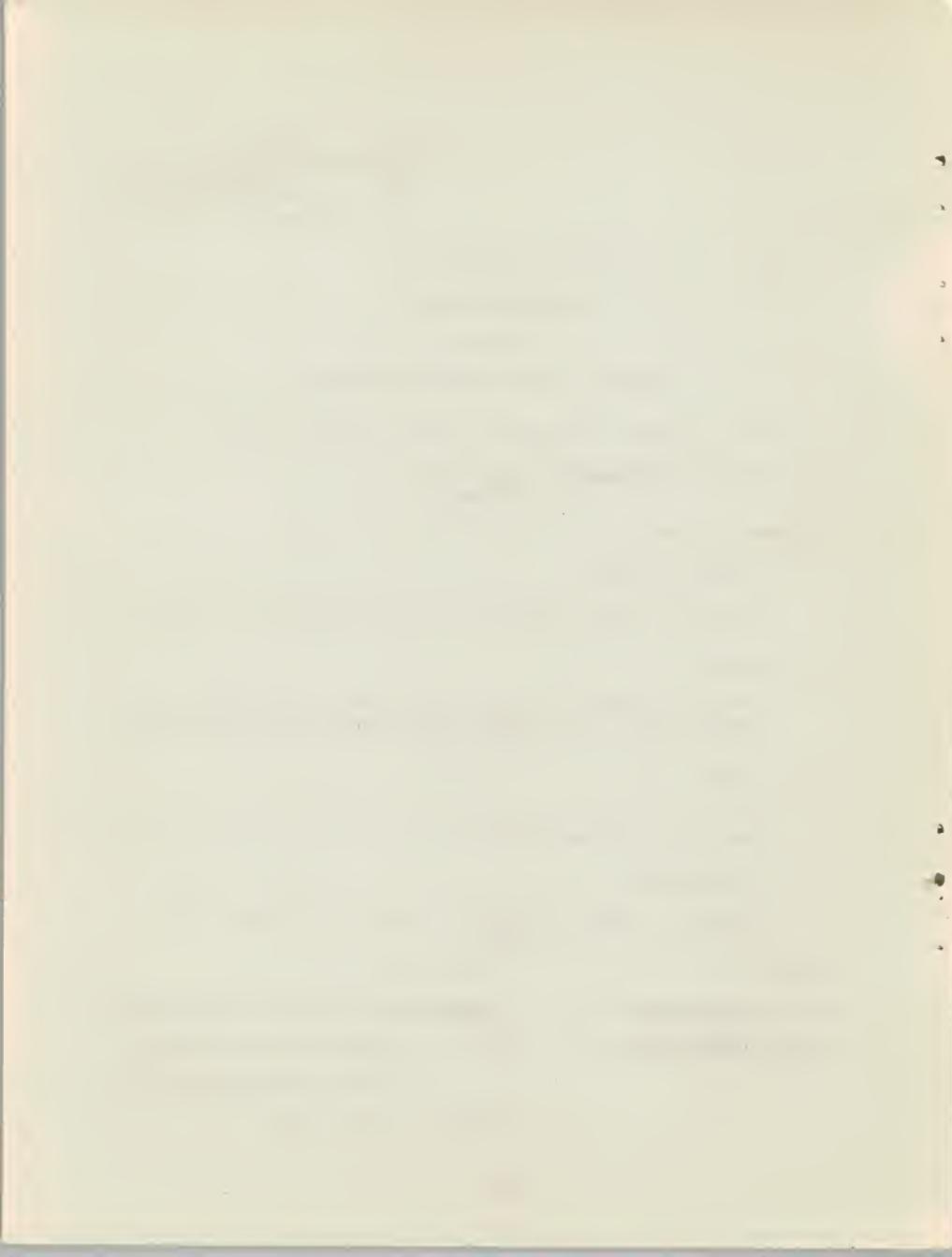
Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



STATE	Montana
PROJECT NO.	W-45-M-2
DATE	July 15, 1953
VOL.	IV
NO.	2

FINAL REPORT FOR
MAINTENANCE PROJECTS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Maintenance of Blackfoot-Clearwater Big Game Range
2. Personnel: Stan Mongrain, Project Leader
Jack Ray, Junior Fieldman
3. Dates: This project was effective from July 1, 1952 through June 30, 1953.
4. Report:

A. CANALS AND DITCHES:

Headgates required minor repair, cleaning, channel alteration and clearing and some reinforcement.

The entire ditch system was cleaned and repaired where necessary.

Rebuilding of the 5,800 feet of ditch was not done because wet weather would not permit access of heavy machinery in the boggy site of this ditch. Unless ideal conditions exist, this is impossible and consideration is being given to an alternate ditch arrangement.

B. BRIDGES:

Two main bridges were repaired by replacing stringers and decks. Several small bridges were repaired on access roads inside the project.

C. ROADS:

Interior roads were graded both to facilitate travel and for the purpose of firebreaks.

Periodic snow removal was needed throughout the winter on the main entrance road, around the headquarters buildings and to the elk feeding pens.

D. FENCES:

The horse pasture and the fence around the meadow required considerable repair. The boundary fences were completely maintained.

Several sections were found to require replacement.

E. NOXIOUS WEED CONTROL:

The field containing the leafy spurge was sprayed by the Powell County crew and indications are that the weed is fairly well under control.

A patch of goat weed which has appeared in the Clearwater River valley was sprayed with not too effective results. It will require more attention to control it.

F. GAME BAITING:

Less time than usual was spent on this activity due to the rather mild, open winter.

Some elk were trapped, tagged and released for migration study purposes.

G. MISCELLANEOUS ACTIVITIES:

Some time was spent on repair of vehicles and equipment. Building repair, painting, and general maintenance was done where necessary.

Approximately three hundred and sixty tons of hay were stored and later distributed for use or sold.

Patrol to eliminate trespass stock required a considerable amount of time.

An electric range was purchased to replace an existing non-serviceable stove.

Submitted by:

Name Faye M. Couey

Title Assistant Director

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

STATE Montana
PROJECT NO. W-47-M-2
DATE July 15, 1953
VOL. IV NO. 2

QUARTERLY PROGRESS REPORT FOR

MAINTENANCE

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title: Maintenance of Sun River Winter Elk Range

2. Personnel: Bruce Neal, Unit Manager
Bob Neal, Assistant Manager
Dave Stonehouse, Laborer

3. Report of Progress:

FENCE REPAIR:

1. The boundary line fence was repaired. Damage had been caused by wind, game, snow and stock.
2. The fence around the W. B. Law place was repaired. This land is leased by the Fish and Game Department.
3. The fence around the Norris place was also repaired. This land borders the Game Range.

FENCES REMOVED:

Approximately three miles of fence around land that Mr. Stecker had traded to the Department was removed.

BUILDINGS REPAIRED:

A cement floor was poured in the Willow Creek Cabin.

BUILDINGS REMOVED:

Two old log cabins were removed and sawed for wood.

DITCHES:

Two miles of irrigation ditch were repaired and cleaned.

ROAD WORK:

1. Approximately three miles of road were built for use as access

to the headquarters camp of the Sun River Game Range.

This work was done by contract with general supervision by Department personnel.

ROAD REPAIR:

A washout in the road was repaired by Department personnel. Also the road was graded several times to smooth the ruts down. Six miles of firebreak were maintained.

HAY HAULED AND STACKED:

Approximately three thousand bales of hay were hauled in and stacked for use in the winter for horse feed and also as a stock pile of feed for the game in case of a loss of feed due to fire.

MISCELLANEOUS:

Wood was sawed for use in three camps to be used in the winter for elk patrol.

Camps were set up and stocked with hay, oats, wood and supplies.

Herdng of elk was conducted during the winter.

INCIDENTAL WORK:

1. A live trap for elk was erected for the purpose of tagging mature elk for migration study as outlined under Project W-1-R-13.
2. Grass was cut and gathered for use by the elk food study in the Game Range Predevelopment program in cooperation with the Montana Cooperative Wildlife Research Unit.
3. Several days were spent on game counts and surveys.
4. Salt was put out in the field for elk use.
5. A short trip was made to Wildhorse Island to help capture mountain sheep.

Submitted by:

Name Robert Neal

Title Assistant Manager

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953

STATE	Montana
PROJECT NO.	W-57-M
DATE	July 15, 1953
VOL.	IV NO. 2

QUARTERLY PROGRESS REPORT FOR

MAINTENANCE PROJECTS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Maintenance of Gallatin Game Range (Porcupine Ranch)

2. Personnel: J. E. Gaab, Unit Biologist, Supervisor
Norman Wortman, Game Range Manager

3. Report of Progress:

1. The headgates at the heads of the irrigation ditches were repaired. Bulldozer work was necessary to provide an adequate flow of water out of the creeks through the headgates. Ditches were repaired to hold water.
2. Temporary fence repair was necessary to hold horses in the pasture.
3. A general clean up around the ranch buildings was made.
4. Irrigation of the meadows and pastures was carried on.

Submitted by:

Name J. E. Gaab

Title Unit Biologist

Approved by:

Montana State Department of Fish and Game

By Robert F. Cooney, Director

Wildlife Restoration Division

Date July 15, 1953



